INDEPENDENT OVERSIGHT EVALUATION OF ENVIRONMENT, SAFETY, AND HEALTH PROGRAMS AT THE IDAHO NATIONAL ENGINEERING LABORATORY

October 1995

Office of Oversight
Environment, Safety and Health
U.S. Department of Energy

FOREWORD

The *Evaluation of Environment, Safety, and Health Programs at the Idaho National Engineering Laboratory* is the second assessment of a major Department of Energy (DOE) facility since the Office of Environment, Safety and Health (EH) significantly revised its program of independent oversight. This program seeks to provide an efficient and realistic appraisal of DOE's performance in managing safety, health, and environmental protection at its facilities, and to do so in a way that is rigorous and independent of line management, yet useful to those who are responsible for managing these operations.

The approach to oversight is based on the fundamental premise that line managers are responsible for managing safety through proper work planning, hazard analysis, and hazard control. The systems, processes, and procedures used by Federal managers to assure environmental protection and worker health and safety are assessed against clearly defined principles and criteria—a template—for a sound environment, safety, and health program. The template is designed to accommodate the wide range of operations, hazards, and management styles found throughout the DOE complex. This template will serve as the benchmark against which environment, safety, and health management programs are judged.

The main focus of these evaluations is on Federal management systems in DOE program and field office operations. EH samples contractor performance to validate overall findings, but does not duplicate the line program's day-to-day responsibility to audit contractors. Comprehensive evaluations examine major environmental, safety, and health issues in a single multidisciplinary assessment that is efficient and produces a comprehensive picture of program strengths, vulnerabilities, and priorities. These evaluations are based on formal protocols and procedures designed to assure balanced and validated conclusions.

The assessment found that the Idaho National Engineering Laboratory has instituted an effective safety management program. Its effectiveness is largely due to a competent workforce combined with innovative management in the Idaho Operations Office and Lockheed Martin, the operating contractor. Roles, responsibilities, and authorities are generally well understood, and procedures are in place to hold managers accountable for safety performance. Workers are knowledgeable of and actively involved in ensuring safe operations. This culture and teamwork are evident in the successful decommissioning of more than 25 facilities, with an excellent safety record.

It is a basic premise of DOE that line managers are responsible for safety, and that they should manage safety on a day-to-day basis as carefully and competently as they manage the bottom line. It is our hope and expectation that focused and validated oversight evaluations of management performance, such as this one, will hold managers accountable for safety in a way that is fair and effective while providing DOE managers with information and analyses that can help make DOE safer.

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Assistant Secretary
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EXECUTIVE SUMMARY

BACKGROUND

The Office of Environment, Safety and Health (EH) independent oversight organization conducted an evaluation of safety management at the Idaho National Engineering Laboratory (INEL) from June to September 1995. The evaluation selectively sampled various INEL management systems, programs, facility operations and activities, and engineering systems that are considered essential to worker, public, and environmental safety. Three guiding principles for safety management formed the basis for the evaluation: **1) line managers are responsible and accountable for safety; 2) comprehensive requirements are established, appropriate, and implemented; and 3) competence is commensurate with responsibility.** These principles, and their associated criteria, represent the template for an effective safety management program.

INEL's mission is to integrate engineering, applied science, and operations in an environmentally conscious, safe, and cost-effective manner to solve problems relating to the environment, energy production and use, U.S. economic competitiveness, and national security. Significant quantities of spent fuel, radioactive materials, chemicals, and mixed waste are present at INEL. The principal hazards at INEL are associated with these materials, and with reactor operations, construction and demolition activities, and other activities involving electrical equipment, chemical processes, or machine tools.

The recent change in the management and operating contractor, as well as a new approach to Idaho Operations Office (ID) management of the contract, were factors in selecting INEL for evaluation. In 1994, most contractor activities at INEL were consolidated under a single contract awarded to Lockheed-Martin Idaho Technologies Company (LMIT). This new approach is intended to consolidate all INEL operating activities under a blanket of common policies, programs, and procedures. Under contract reform, the new operating contract includes a phased transition from an award fee to an incentive-based performance remuneration process. Concurrently, DOE line management is redefining their role to take an "arms-length" approach to management, focusing on defining expectations and measuring performance rather than how activities are accomplished.

The evaluation focused on the various levels of safety management for INEL, including DOE Headquarters Offices of Environmental Management (EM) and Nuclear Energy (NE), ID, LMIT, and selected subcontractors. Four INEL facilities were selected for review in this safety management evaluation: Radioactive Waste Management Complex (including Pit-9 environmental remediation), Auxiliary Reactor Area (including decontamination and decommissioning), Test Reactor Area (including Advanced Test Reactor), and Idaho Chemical Processing Plant.

RESULTS

Safety Management Principle 1 - Line Managers Are Responsible and Accountable For Safety

INEL line management, ID, and the site management and operating contractor, LMIT, have accepted responsibility and accountability for safety management at INEL. They have demonstrated a commitment to ensuring safety policies and goals, and ID has developed a site-specific version of the DOE Functions, Assignments, and Responsibilities Manual. Both ID and LMIT are strongly committed to matrix management. Matrix management provides flexibility in the allocation of ES&H resources, but can be difficult to implement in an environment of change such as that currently being experienced at INEL. Continuous management attention

will be required to ensure understanding of roles and responsibilities, effective communications and cooperation, and equity in the sharing of matrixed personnel.

A safety-conscious culture is evident across the site. INEL has decommissioned over 25 facilities with an excellent safety record; the use of dedicated teams (i.e., individuals that are assigned to work together on a long term basis) has been instrumental in achieving this success. Environment, safety, and health (ES&H) programs have been strengthened by emphasis on strategic planning, rigorous program and project management, clear performance measures and indicators, safety-oriented procurement procedures, flexible approaches to managing technical support resources (i.e., matrix management), stringent conduct of operations, and detailed work planning.

As might be expected in the consolidation of the safety management programs of the five previous operating contractors, there are areas where line management responsibility for safety can be improved. LMIT management needs to accelerate the consolidation of policies and programs to ensure institutionalization of the program and consistency of operations across the site. Both LMIT and ID need to more clearly define and effectively implement oversight of subcontractor ES&H performance, including roles and responsibilities, level of oversight, and applicability of DOE and industry standards.

Safety Management Principle 2 - Comprehensive and Appropriate Requirements Are Established and Effectively Implemented to Counteract Hazards and Assure Safety

Applicable DOE and industry requirements are being effectively implemented on an overall basis at INEL. At individual facilities, ES&H programs are generally implemented in compliance with applicable requirements, and most procedures are comprehensive, detailed, and reflective of the current facility operations. Some individual programs were particularly effective, such as radiation protection, asbestos abatement, and the programs essential to environmental protection and waste management. In addition, INEL has made progress in establishing authorization basis documents that are consistent with new requirements, and most safety analysis reports have been updated within the last 5 years.

Although INEL programs generally comply with applicable Departmental and industry requirements, there were areas where improvements are warranted in the analysis of hazards and management of requirements. The most significant weaknesses were identified in the management control of modifications to safety-related engineering systems. The evaluation identified major modifications to the heating/ventilation and air conditioning and emergency core cooling fire water injection systems at the Advanced Test Reactor that had remained uncompleted for several years despite being determined to be required by INEL management. The failure to complete and implement these modifications reflects adversely on engineering, configuration management, issues management, and management oversight.

Other areas of requirements management identified as warranting improvement include: (1) strengthening ID and LMIT self-assessment programs, (2) expediting and prioritizing the consolidation of programs and procedures that impact safety, and (3) clarifying and communicating DOE policy and approach on Order compliance, including "Necessary and Sufficient."

Safety Management Principle 3 - Competence is Commensurate With Responsibilities

ID and LMIT managers and workers generally displayed **competence commensurate with responsibilities**. ID is staffed with experienced managers who are knowledgeable of and actively involved in facility operations and safety. LMIT has brought in over 70 experienced senior managers with extensive experience in areas such as commercial nuclear operations and with fresh perspectives on safety management. The capabilities and

experience of the "new" managers complement the facility-specific skills and qualifications of the INEL workforce.

Workers are capable of recognizing workplace hazards and understand their authority and responsibility to stop work where necessary to protect personnel and the environment. Worker participation and involvement in safety programs and procedures are clearly evident and supported by both ID and LMIT management.

Subcontractor competence was appropriate except in one area, where there was overreliance on apprentice-level personnel, some of whom did not have prior experience in the work to be performed. Enhancements are considered to be warranted in several areas associated with INEL training programs. LMIT should accelerate implementation of the consolidated training program at the facility level to ensure structure and consistency across the site. ID's training program should be formalized and accelerated. Finally, LMIT's current emphasis on increasing employee and union involvement in safety should be continued through safety committees, award programs, and partnering on safety policies, issues, and improvements.

CONCLUSIONS

Safety management at INEL, based on this independent sample, is effective. ID and LMIT have established much of the foundation for a strong safety management program. Experienced and aggressive managers and a safety-conscious workforce are currently compensating for the incomplete consolidation of policies, programs, and procedures, and the full institutionalization of a sitewide safety management program.

Safety management at INEL will be further strengthened as the consolidation is completed, areas such as engineering support, issues management and subcontractor ES&H performance improved, and new initiatives such as safety committees, the INEL Institute, and participation in the Voluntary Protection Program fully implemented. ID and LMIT management, however, will need to ensure that potential challenges to safety do not unduly impede this progress, or reduce the safety margin afforded to workers, the public, and the environment. Examples of these challenges include continuing reductions in funding, staff downsizing, the loss of experienced managers, changing mission and priorities, and the increasing use of subcontractors and privatization.

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ACRONYMS AND INITIALISMS

ALARA	As low as reasonably achievable
ARA	Auxiliary Reactor Area
ATR	Advanced Test Reactor
CERCLA	Comprehensive Environmental Response and Compensation Liability Act
D&D	Decontamination and decommissioning
DOE	U.S. Department of Energy
EH	U.S. Department of Energy Office of Environment, Safety and Health
EM	U.S. Department of Energy Office of Environmental Management
ES&H	Environment, safety, and health
FM	U.S. Department of Energy Office of Field Management
FY	Fiscal year
HVAC	Heating, ventilation, and air conditioning
ICPP	Idaho Chemical Processing Plant
ID	U.S. Department of Energy Idaho Operations Office
INEL	Idaho National Engineering Laboratory
LESAT	Lockheed Environmental Systems and Technologies Company
LMIT	Lockheed Martin Idaho Technologies Company
LOCA	Loss of coolant accident
M&O	Management and operating
NWCF	New Waste Calcining Facility
NE	U.S. Department of Energy Office of Nuclear Energy
OCI	Organizational conflict of interest
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PRA	Probabilistic risk assessment
RCRA	Resource Conservation and Recovery Act
RWMC	Radioactive Waste Management Complex
SAR	Safety analysis report
SRID	Standards Requirements Identification Document
SWEPP	Solid Waste Examination Pilot Plant
TRA	Test Reactor Area
TSA-RE	Transuranic Storage Area-Retrieval Enclosure
UFSAR	Updated final safety analysis report
WSF	Waste Storage Facility

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1.0 INTRODUCTION

An independent oversight safety management[1] evaluation of the Idaho National Engineering Laboratory (INEL) was conducted from June through September 1995 by the Office of Oversight, U.S. Department of Energy (DOE). The purpose of the evaluation was to determine how well DOE and contractor line management[2] have implemented safety management and environment, safety, and health (ES&H) programs at INEL. As used in this report, "INEL" refers to both the DOE Idaho Operations Office (ID) and the contractors who perform work at the direction of ID.

The Office of Oversight evaluated safety management programs at the Idaho National Engineering Laboratory (INEL) from June through September 1995.

BACKGROUND

This evaluation was conducted as part of the Department's independent oversight program, which was consolidated in December 1994 under the Office of Environment, Safety and Health (EH) into the Office of the Deputy Assistant Secretary for Oversight. A major objective of the Office of Oversight is to provide accurate and comprehensive information on and analysis of the effectiveness of the Department's ES&H programs to DOE program, field, and contractor managers; the Secretary of Energy; the Assistant Secretary for Environment, Safety and Health; Congress; and the public.

INEL is located on 890 square miles of desert in a rural, sparsely populated section of southeastern Idaho. INEL's mission is to integrate engineering, applied science, and operations in an environmentally conscious, safe, and cost-effective manner to solve problems relating to the environment, energy production and use, U.S. economic competitiveness, and national security.

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[1] **Safety management** refers to those measures required to ensure that an acceptable level of safety is maintained throughout the life of a facility or installation.

[2] **Line management** refers to the unbroken chain of command that extends from the Secretary through the Under Secretary to the Cognizant Secretarial Officers, field organization managers, and contractors. Line management consists of DOE and contractor personnel organizationally or contractually responsible for work or job tasks, as well as effective safety.

This report contains the results of the ES&H evaluation conducted at INEL. This site was selected for review because it conducts unique and diverse activities, such as spent fuel storage; solid radioactive waste storage, processing, and disposal; nuclear reactor testing; decommissioning and decontamination; and cleanup of radioactive and hazardous materials. These activities all present diverse management challenges to worker safety and health, public safety, and environmental protection. Other factors affecting site selection included the October 1994 change in the management and operating contractor, as well as a new approach to Departmental management of the contract.

This site's diverse activities present unique challenges to safety management.

INEL was established in 1949 as the National Reactor Testing Station, and contains the largest concentration of nuclear reactors in the world. Most of the reactors have been disassembled or placed in cold standby after completing their research missions. Only the Advanced Test Reactor is now operating. This reactor is used to test the effects of radiation on different materials and to produce radioisotopes used in medicine, research, and industry.

Significant quantities of spent fuel, radioactive materials, chemicals, and mixed waste are present at INEL. The principal hazards at INEL are associated with these materials, and with reactor operations, construction and demolition activities, and other activities involving electrical equipment, chemical processes, or machine tools.

Contractor activities at INEL are managed by ID, with the exception of Argonne National Laboratory-West, which is managed by the DOE Chicago Operations Office through the Argonne Area Office-West, and the Naval Reactors Facility, which is managed by Westinghouse-Bettis at the direction of the Pittsburgh Naval Reactors Office. Program development and direction from DOE Headquarters are provided primarily by the Offices of Environmental Management (EM) and Nuclear Energy (NE).

Most contractor activities are managed by the Idaho Operations Office (ID).

In October 1994, contractor activities at INEL, except those at Argonne National Laboratory-West and the Naval Reactors Facility, were consolidated under a single contract awarded to Lockheed Idaho Technologies Company, which included member companies of Lockheed, RUST, Duke, Babcock and Wilcox, Parsons, and Coleman. With the recent merger between Lockheed and Martin-Marietta, the operating company was renamed Lockheed-Martin Idaho Technologies (LMIT).

Contractor activities have been consolidated under one contract with Lockheed-Martin Idaho Technologies (LMIT).

Contractors, DOE, and other Federal agencies at INEL employed more than 12,500 personnel in 1994, including about 1000 construction subcontractor personnel. The number of contractor personnel employed at the site is being reduced steadily as the work is consolidated.

Figure 1 shows the organizational structure and principal roles of the DOE offices and contractors that were the focus of this evaluation.

The operating contract requires innovative approaches to business management.

ID, EM, and NE recognized that consolidation of site operations under a single contractor would require extensive changes in business and project management practices. The 1994 recompetition of the site management contract specifically requested that bidders propose innovative approaches to business management, such as project management, information management, procurement, contracting, and document management.

LMIT has implemented a matrix management approach for some functions.

One of the most significant organizational changes that occurred after LMIT took over is the implementation of a matrix management approach for some functions. In a matrix management approach, some, but not necessarily all, staff are provided to programs or technical support assignments on a temporary basis, while a matrix manager manages the allocation of these staff and performs administrative functions for assigned staff. For example, matrix personnel, such as radiation control technicians, may be assigned to a specific facility or program for a specific task. When a task is completed, the matrix individual may be reassigned. LMIT has implemented the matrix management approach to reduce costs, promote efficient utilization of personnel, and ensure consistency in implementing appropriate requirements to meet INEL ES&H goals.

ID has adopted a similar approach for some functions.

ID is using a similar approach for the same reasons. ID ES&H professionals, including facility representatives, are matrixed to ID program and facility managers but report to a matrix group manager, who is responsible for personnel administration and resource allocation. Figure 2 shows the organization of the matrixed portions of the ID organization.

ORGANIZATION OF THE REPORT

The conceptual basis for the evaluation is provided in Section 2. Section 3 presents the detailed results of the evaluation. Conclusions and ratings are presented in Section 4. Candidate actions that managers might wish to consider for improving safety management at INEL are offered in Section 5. Appendix A presents detailed facility-specific results. Details on the evaluation process and the team composition are included in Appendix B.

Figure 1. INEL Line Management

Figure 2. The ID Matrix Management Approach

2.0 EH APPROACH TO OVERSIGHT EVALUATIONS

CONCEPTUAL BASIS FOR EVALUATION

The Office of Environment, Safety and Health has developed a conceptual framework for evaluations.

As a basis for oversight evaluations of environment, safety, and health, EH has formulated a conceptual framework that characterizes the principles, programs, and disciplines that are essential elements of a sound safety management program. This approach to oversight is based on the fundamental premise that line managers are responsible for managing safety through proper work planning, hazard analysis, and hazard control. The adequacy of the systems, processes, and procedures managers used to assure environmental protection and worker health and safety were assessed against a set of clearly defined principles and accompanying criteria. This generic framework can accommodate the wide range of operations, hazards, and management styles at DOE facilities. At the same time, the framework serves as a template against which managers can assess the adequacy of current safety efforts and from which, over time, an understanding of site-specific trends and inter-site comparisons can be drawn.

The framework centers on three fundamental safety management principles and associated criteria.

The conceptual framework centers around three of the five fundamental management principles[3] identified by the Secretary of Energy in an October 1994 letter to the Defense Nuclear Facilities Safety Board. The letter included a comprehensive description of the functions that the Department deems necessary to fulfill its mandate under its enabling legislation to provide "reasonable assurance that the safety and health risk of operating personnel and the public be minimized."

The fundamental principles for an effective safety management program are discussed below. Criteria are summarized in Figures 3 through 5.

Principle #1 - Line managers are responsible and accountable for safety.

The first principle is that line managers are responsible and accountable for safety.

Organizations that have effective safety management programs place accountability and responsibility for safety with line managers. Accordingly, line management personnel must ensure that the

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[3] Five guiding principles are identified in the Secretary's letter: line management responsibility for safety, comprehensive requirements, competence commensurate with responsibilities, independent oversight, and enforcement. The last two are performed by the Office of Oversight and other Departmental elements. The evaluation of INEL, therefore, focused on INEL's effectiveness in implementing the first three of the five guiding principles, which are directly applicable to line management.

Principle #1 - Line managers are responsible and accountable for safety.

Criterion 1-1: Clear Safety Policies and Goals

Line management implements effective safety policy and goals that reflect Departmental policies and industry standards and assures a safety culture that permeates every level of the organization.

Criterion 1-2: Defined Responsibilities and Authorities

Line managers are responsible and accountable for ensuring that DOE facility operations and work practices are performed in a manner that provides adequate protection to worker safety and health, the public, and the environment. Accordingly, line managers must ensure that:

- A clear division of responsibilities is established and communicated.
- Line managers have the authority to make and implement decisions regarding ES&H that are commensurate with their responsibilities.
- There are clear mechanisms throughout the line organizations for adjudicating disputes among line managers where discrepancies are believed to exist between work goals and ES&H management needs.

Criterion 1-3: Project and Resource Management Systems

Decision makers at appropriate levels of the organization must be capable of understanding and synthesizing program goals and ES&H risks in order to effectively deploy resources adequate to address both. Line managers must manage safety and its attainment by establishing management information systems to ensure that:

- Hazards are analyzed and understood.
- Appropriate hazard mitigation actions are identified and are in place.

Criterion 1-4: Line Management Accountability for Performance

Line managers are accountable for ES&H performance. Performance should be explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers must execute actions to attain and continuously improve the safety of their operations by ensuring that:

- Safety-related matters are reviewed, monitored, and audited on a regular basis.
- Findings resulting from these reviews, monitoring activities, and audits are resolved in a timely manner.

Figure 3. Criteria for Principle #1

Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.

Criterion 2-1: Requirements Management

Responsibilities and accountabilities must be clearly defined to ensure that requirements are identified, transmitted, and implemented, and that they provide adequate protection to worker safety and health, the public, and the environment.

Criterion 2-2: Hazards Analysis

Hazards generally change as a facility cycles through the phases of design, construction, operation and maintenance, decommissioning and decontamination, and environmental restoration. It is thus important to continually analyze and assess hazards in order to identify the relative significance and application of Department requirements. To effectively mitigate hazards, line managers must ensure that:

- Requirements are established that are commensurate with hazards throughout the life cycle of the facility.
- Internal requirements are based on hazards analyses and, when implemented, are sufficient to ensure safety.
- Site-specific implementation plans and associated operating procedures define standards that will be used to comply with applicable safety requirements.
- The site is in compliance with applicable Federal and state statutes and Departmental policy and requirements.

Criterion 2-3: Implementation of Requirements

Line managers are responsible for ensuring that contractors comply with defined requirements and that compliance is verified by DOE management.

Criterion 2-4: Assessment Programs

Line management must establish and implement effective methodologies to monitor, review, and evaluate adherence to all applicable Departmental requirements and industry standards for safety and to achieve timely correction where warranted.

Figure 4. Criteria for Principle #2

Principle #3 - Competence is commensurate with responsibilities.

Criterion 3-1: Staffing and Qualifications

The organization supports effective safety management by assuring appropriate levels of staffing and competence at every level. The organization has in place the means to:

- Determine the appropriate levels of staffing, experience, and training for each function, including consideration of responsibilities, activities, hazards, and schedules.
- Assure that subcontractors employed on site are adequately trained and qualified on job tasks, hazards, and DOE and contractor safety policies and requirements.
- Clearly identify vertical and horizontal lines of interface, communication, and support.
- Provide managers and supervisors with sufficient authority, staffing, and support to implement assigned responsibilities, analyses, and decisions.
- Develop and implement strategies for recruitment and retention of competent personnel.

Criterion 3-2: Technical Competence and Knowledge of Hazards

Workers and managers are technically competent to perform their jobs and are appropriately educated and knowledgeable of the hazards associated with site operations. Line managers must ensure that:

- Workers have the technical capability to recognize and respond appropriately to workplace hazards.
- Management, technical staff, and workers have the necessary levels of education, training, and experience.

Criterion 3-3: Worker Participation and Empowerment

Line managers recognize that active participation by workers is essential in maintaining and improving protection to worker safety and health, the public, and the environment. Therefore, line managers must ensure that:

- Workers and managers are empowered to take appropriate action in the face of hazards encountered during normal and emergency conditions, including the right to refuse unsafe work assignments.
- Processes for raising safety issues are established.
- Incentives are in place to promote a safety-conscious culture and worker participation and involvement in safety management.

Criterion 3-4: Training Programs

Line managers must establish and implement processes to ensure that training programs effectively measure and improve performance, and identify additional training needs.

Figure 5. Criteria for Principle #3

safety management program includes safety policies and goals that are clearly articulated and communicated; well defined responsibilities and authorities; effective management systems to identify, analyze, prioritize, and mitigate risks; and a process for ensuring that management is accountable for its safety performance.

Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.

The second principle is that requirements exist, are appropriate, and are executed.

An effective safety management system must include processes to identify, communicate, execute, and monitor all applicable requirements, including Federal and state regulations as well as DOE requirements. Accordingly, a responsibility for managing requirements must be established, a hazards analysis process must be implemented and applicable requirements identified and translated to procedures, procedures must be implemented by personnel in the facilities, and systems to assess compliance and effectiveness and to correct non-compliant conditions must be in place.

The criteria are intended to be flexible enough to encompass evolving approaches to hazard analysis and requirement identification.

DOE is in the midst of a significant change in its approach for analyzing hazards and identifying applicable requirements that must be implemented to control those hazards. Most notably, DOE is transitioning from orders to rules. The criteria for Principle #2 are intended to be sufficiently flexible to encompass all of the current and developing approaches to analyzing hazards and identifying appropriate requirements. The following paragraphs clarify the scope of the individual criteria under this principle.

The first criterion focuses on the management functions that are necessary to implement hazard analysis processes. Included in this criterion are functions such as identifying individuals and teams to conduct hazards analyses at various facilities, assuring that the necessary resources are available, prioritizing activities, reviewing progress and status, maintaining documentation, establishing configuration control, evaluating and approving site-specific processes, and determining whether expectations are being met. In short, the first criterion focuses on the infrastructure underlying the second principle.

The second criterion focuses on the effectiveness of the actual process for analyzing hazards and identifying requirements. It encompasses the processes for translating the applicable requirements to site- and facility-specific procedures, and for updating those procedures as conditions change. The emphasis is on whether the processes used at the site are achieving the desired goal; this is a set of requirements and procedures that, if implemented, will effectively control the hazards. Also important is whether the site has a formal, current authorization basis for its facilities and whether the site is meeting established commitments for developing such an authorization basis.

The third criterion focuses on implementation of requirements sitewide and at specific facilities. The emphasis is on whether the requirements are understood at the working level, and implemented as intended.

The fourth criterion encompasses the various programs that assess compliance and effectiveness and provide feedback to line management. These include self-assessments, surveillances, audits, quality assurance, management walk-throughs, and similar formal and informal measures.

Principle #3 - Competence is commensurate with responsibilities.

The third principle is that competence is commensurate with responsibilities.

A fully functioning safety management system will have workers and managers who are technically competent to perform their jobs and who are appropriately educated and knowledgeable of the hazards associated with site operations. Management must assure that effective training programs are in place and that the sufficient qualified staff are available. Workers must have the technical capability to recognize and respond to workplace hazards. Active worker participation in maintaining and improving worker safety and health, including the ability to stop work when unsafe practices are recognized, is essential.

EVALUATION SCOPE

These principles and criteria were used to evaluate the effectiveness of the INEL safety program.

These principles and criteria were applied to evaluate the effectiveness of the INEL safety management program in protecting the safety and health of workers, the public, and the environment. The evaluation focused on the following organizations responsible for safety management at INEL:

- EM and NE, the cognizant secretarial offices at DOE Headquarters primarily responsible for program development and direction of the activities reviewed during the evaluation
- ID, responsible for execution of DOE programs at INEL
- LMIT, the DOE contractor that manages and operates the site, and the various subcontractors supporting LMIT on the site.

Program implementation was reviewed at four facilities.

The effectiveness of sitewide ES&H management systems was evaluated. However, in order to understand how safety management is actually implemented at INEL, four selected facilities were assessed:

- Radioactive Waste Management Complex, including Pit-9. which is a fixed-price environmental remediation effort being undertaken at the Radioactive Waste Management Complex facility
- Auxiliary Reactor Area, which includes an active decontamination and decommissioning project
- Test Reactor Area, which includes one operating reactor, the Advanced Test Reactor
- Idaho Chemical Processing Plant.

Figure 6 provides a overview of the work and associated hazards in these facilities, as well as some of the factors driving their selection for review. Appendix A provides more details on the background and principal hazards at these facilities.

Vertical reviews of selected programs, functional areas, and systems were conducted.

For each facility, the team conducted vertical reviews (i.e., detailed reviews of a system, from the management functions to the implementation on the "shop floor") to determine the effectiveness of the safety management system in place. The vertical reviews examined selected programs and functional areas, such as radiation protection, waste management, industrial safety, industrial hygiene, construction safety, process safety, and criticality safety. At the Test Reactor Area and Idaho Chemical Processing Plant, the vertical reviews also included an evaluation of the adequacy of engineering systems essential to protection of workers, the public, and the environment, such as standby and emergency electrical power, emergency core cooling, emergency fire water injection, heating, ventilation, and air conditioning.

In conducting the vertical reviews, the evaluation team used the guiding principles and associated criteria to collect and evaluate information specific to individual facilities. Facility-specific information was evaluated in combination with other data (e.g., results from management interviews) to evaluate the effectiveness of the INEL safety management system with respect to the guiding principles.

Figure 7 presents an overview of the stages of the evaluation process, and examples of the activities that were conducted in each stage. Additional detail on the evaluation team and procedures is included in Appendix B.

The review covers a useful cross-section of the safety management program.

The results provide useful insight into the effectiveness of the overall safety management program at INEL. Evaluation results should be viewed in the context of the scope of the evaluation and the sample of facilities and topics selected for review; findings applicable to certain facilities and specifically identified deficiencies may not be representative of all other areas and buildings at INEL. Nonetheless, since the facilities and activities selected for evaluation engage a diverse cross-section of the ES&H program, the Oversight team believes that the facilities selected for review represent a valid sample of overall INEL ES&H program performance.

FACILITY	NATURE OF WORK	PRINCIPAL HAZARDS	SELECTION FACTORS
Radioactive Waste Management Complex, including Pit-9 which is a fixed-price environmental remediation effort being undertaken at the Radioactive Waste Management Complex facility	• Storing a variety of low-level, mixed, and transuranic wastes for storage in burial grounds, retrievable storage pads, and enclosed storage facilities. • Several waste remediation projects on site. • Construction of new waste storage and remediation facilities.	• Buried hazardous and radioactive (mixed) transuranic waste, which could potentially leak to the environment. • Ongoing handling of radioactive and hazardous wastes. • Construction activities.	• Unique management challenges associated with fixed-price Pit-9 project. • Significant ongoing construction and remediation. • Several subcontractors and lower tier subcontractors.
Auxiliary Reactor Area (ARA), which includes an active decontamination and decommissioning project	• Decontamination and decommissioning (D&D) of dismantled nuclear reactor facilities (reactors have been dismantled and removed, or buried) • D&D projects are ongoing at ARA-II and ARA-III. The D&D activities are typically small in scale, ranging from 2000 to 8000 square feet.	• Construction, razing, and disassembly activities conducted as part of the D&D effort. • Radioactively contaminated materials could potentially leak to the environment if not adequately controlled. However, except for the buried SL-1 reactor components, radioactive materials have been removed from the facilities and the only radiation hazards are associated with equipment that may be contaminated. • D&D activities generate some low-level waste and small amounts of Toxic Substances Control Act waste (such as asbestos and small amounts of polychlorinated biphenyls) and Resource Conservation and Recovery Act (RCRA) waste.	• ARA has the most active and significant ongoing D&D projects at INEL.
Test Reactor Area, which includes one operating reactor, the Advanced Test Reactor (ATR)	• Reactor operations. Materials and fuels are placed in test locations within and around the extremely high neutron flux generating core of the ATR to test their response to reactor environments. ATR also produces radioisotopes for medical and industrial applications.	• Associated with current and past operation of nuclear reactors. • Low-level radioactive and hazardous industrial wastes. • Radiological hazards from irradiated nuclear fuels temporarily stored in several shutdown reactor facilities and residual radiation from activated/contaminated components at such facilities. • ATR, as an operational nuclear facility, has a substantial post-accident nuclear source term. • Radiological hazards result from the ATR's irradiation component and material testing and radioisotope production mission. • Electrical and mechanical hazards from equipment.	• Only operating reactor at INEL. • Several essential systems must be maintained.
Idaho Chemical Processing Plant	• Reprocesses spent fuel from government reactors (all of the reprocessing operations are currently idle). • Stores irradiated fuel from government reactors and liquid radioactive wastes from fuel reprocessing activities and other nuclear operations. • Houses a variety of facilities for radioactive waste storage and treatment, including the new waste calcining facility, where liquid radioactive waste is reduced by thermal treatment to solid waste, and the tank farm facility and associated evaporators, where liquid radioactive wastes are stored, blended, and/or volume-reduced. • Implementing a deactivation, decontamination, and decommissioning program that includes recovery of fissile material from the Rover facility in Building CPP-640. • A major effort to remove spent reactor fuel from CPP-603 to CPP-666 is under way in accordance with external commitments.	• Storage of corrosive, highly radioactive waste in underground storage tanks, transfer of this waste to processing facilities, and operation and maintenance of processing facilities. • Radiological and criticality hazards associated with storage of irradiated fuel. • Ongoing construction of new facilities, particularly the tank farm upgrade project. • New waste calcining facility evaporation. • Deactivation and decommissioning of facilities.	• Significant and diverse hazards. • New processes. • Several essential systems.

Figure 6. Work and Hazards at INEL Facilities Reviewed

EXAMPLES OF EFFECTIVE HAZARDS ANALYSIS AND WORK PLANNING

- TRA has effectively integrated real-time dose tracking into their work control processes through the use of the “Fast Track” electronic dosimetry measurement system. Work package radiation exposure records show that the use of the "Fast Track" system is an innovation that has resulted in reduced personnel radiation exposure on many jobs and at the site in general.
- Idaho Chemical Processing Plant has achieved a significant reduction in the generation of hazardous and non-hazardous waste, and there is a comprehensive waste minimization planning process in place.
- The asbestos control program at Idaho Chemical Processing Plant ensures the minimum potential safety hazard to workers. The asbestos control program features an effective policy to reduce the potential for exposure, trained personne available to respond anytime to potential concerns, and effective controls over work on asbestos-related tasks.
- Extensive mockup training was conducted for repairs/modification performed earlier this year on systems inside the blend and hold cell at the new waste calcining facility. This training directly resulted in about a factor of ten reduction in the total radiation exposure received during the work.
- Compliance activities for the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response and Compensation Liability Act (CERCLA) are more than sufficient to meet applicable requirements.

EXAMPLES WHERE REQUIREMENTS WERE NOT IDENTIFIED OR IMPLEMENTED

- A change in the procedure for surveying materials for radiological release that exempts materials located outside of a radiological buffer area has no documented technical basis.
- Daily air sampling at the tank farm valve box is not consistent with the Radiation Control Manual, which requires sampling whenever radioactivity levels can fluctuate.
- Streaming radiation experienced during fuel movement at the Idaho Chemical Processing Plant CPP-666 basin may increase the potential for personnel exposure; a requirement for lateral shielding of nuclear fuel had not been developed or implemented, creating the potential for increased radiation exposure and an Unreviewed Safety Question.
- Idaho Chemical Processing Plant has not identified the requirement or implemented a program to inspect loading and unloading areas of treatment, storage, and disposal units daily when they are in use. Failure to perform these inspections exposes INEL to possible enforcement actions.
- The current configuration of the Advanced Test Reactor HVAC backup dampers and their air supply system were found not to be supported by design basis and operational documents.
- Modifications required to support the design basis seismic qualification of the Advanced Test Reactor fire water injection system piping have not been completed.

Figure 7. Examples of Good Practices and Ineffective Practices

EVALUATION RATING SYSTEM

The rating system uses colors to provide a visual summary of performance within safety management systems, programs, or functions. The colors and their meanings are as follows:

Red: Significant weakness
Yellow: Improvement needed
Green: Acceptable performance
Blue: Exceptional performance.

This color rating system is not intended to provide a relative rating between specific facilities or programs at different sites because of the many differences in missions, hazards, and facility life cycles, and use of sampling techniques.

3.0 RESULTS

This section summarizes the results of the INEL safety management program review for each of the individual criteria associated with the three guiding principles, as delineated in Section 2. In Section 4, these criteria-specific results criteria are analyzed with respect to the three applicable guiding principles and the overall INEL safety management program.

Principle #1 - Line managers are responsible and accountable for safety.

Criterion 1-1: Clear Safety Policies and Goals

ID and LMIT have established clear safety policies and goals for INEL.

ID and LMIT have issued a joint, sitewide, top-level safety and health policy statement defining the overall vision to guide and determine present and future decisions. This policy was developed under the leadership of the INEL Health and Safety Committee and has been coordinated with relevant parties involved with safety at INEL. This policy statement is an example of ID and LMIT management's commitment to safety.

Sitewide policies have also been established for specific hazards and functions as appropriate, e.g., sitewide policies for radiation protection, asbestos hazards mitigation, waste minimization, waste characterization, and chemical control. Managers at some facilities also have issued policy statements to provide additional emphasis on facility-specific issues. There was abundant evidence that safety policies have been communicated throughout the line organization and are understood and embraced by most of the workforce.

Specific goals and objectives have been established for a variety of programs.

ID and LMIT have translated general policies into specific goals and objectives. One of the long-term LMIT goals is to achieve a STAR status in the DOE Voluntary Protection Program. By focusing on the Star

Voluntary Protection Program category, LMIT managers are establishing a long term goal to help focus their activities. ID and LMIT have also established more specific goals and objectives for a variety of programs and functions. For example, goals and objectives for the startup of the high level waste evaporator and the new waste calcining facility have been established and communicated.

LMIT has established a safety involvement team to increase employee and management involvement in ES&H programs, processes, and activities. Chaired by the LMIT ES&H Manager, the safety involvement team includes various representatives who collectively have established safety and health goals for fiscal year (FY) 1996 that emphasize INEL employee involvement in safety. INEL goals are influenced by recommendations from the Environmental Management Site Specific Advisory Board associated with INEL. These recommendations have focused on a variety of issues, including integration of activities, spent nuclear fuel, long term land use, budget priorities, and workforce restructuring plans.

Facilities have generally established a culture conducive to safe work practices.

Safety management evaluations at four major INEL facilities revealed the existence of a culture conducive to safe work practices. With few exceptions (most notably, problems with one subcontractor, which are discussed under Criterion 1-4), important elements of a safety management program (e.g., work planning, health and safety plan implementation, comprehensive procedures, stop-work authority, experienced and trained employees) are in place and functioning.

ID and LMIT management have established practices and procedures that contribute to safety.

Extensive interviews with INEL workers indicate that they recognize and understand their authority and responsibility to stop work. The workers also expressed confidence that they could, and have, exercised that authority without fear of recrimination. Specific examples were noted where this stop-work authority had been successfully exercised. In addition, ID and LMIT management demonstrated their commitment to safety by their actions, such as conducting frequent walk-throughs, establishing an award program for safety performance, and generally promoting an atmosphere conducive to safety. Management actions and/or practices that contribute to safety at one or more of the facilities evaluated include:

- Implementation of "stop-work" authority
- Work hazards analysis and understanding
- Enhanced work planning
- Worker involvement and attitude
- Functioning safety committees
- Safety award program
- Verbatim procedure compliance
- Stringent conduct of operations (per DOE Order 5480.19)
- Testing and maintenance of safety equipment
- Trending performance indications
- Excellent decontamination and decommissioning (D&D) safety record
- Union support and involvement
- Employee concerns program
- Trained and experienced workforce.

Although management has successfully established safety policies and goals, there are indicators of ineffective communication that can adversely affect employees' attitudes toward safety. For example, a number of workers expressed concern about the lack of attendance of LMIT managers at safety involvement team meetings and at facility-specific safety committee meetings.

Communications can be improved in some areas.

In addition, the Environmental Management Site Specific Advisory Board members (which includes external stakeholders, workers, and the unions) indicated that they had not received sufficient feedback as to how their recommendations concerning the safety of INEL activities or prioritization are incorporated into policies or actions, although ID and LMIT management personnel were generally supportive of those recommendations. Timely feedback is essential to encourage continued input to safety from members of the Advisory Board.

Based on a number of employee interviews, there is confusion among workers as to the status of previous safety programs and committees and the changes being initiated by LMIT. This confusion, coupled with the dynamic changes within the organization (e.g., consolidation, implementation of matrix management) has affected employees' acceptance of the new management team.

Criterion 1-2: Defined Responsibilities and Authorities

Roles and procedures have not been fully formalized. However, interviews and reviews at facilities indicated that both ID and LMIT personnel generally understand their roles, responsibilities, and authorities. ID and LMIT line managers expressed a clear understanding that safety is a line management responsibility. At each facility, the workers who were interviewed demonstrated familiarity with procedures and their responsibilities.

Roles and procedures are generally well understood.

ID management has made a concerted effort to ensure that safety responsibilities are clearly defined and understood. ID has several formal documents to help ensure that ES&H roles and responsibilities are defined and communicated. The ID *Business Management Plan* specifies the ES&H roles, responsibilities, management systems, management teams, and performance evaluation for ID personnel involved at the Radioactive Waste Management Complex, and the ID Assurance Division, responsible for sitewide independent oversight, has a manual that contains guidance and instructions for implementing their program. In addition, ID has prepared a draft ID *Manual of Functions, Assignments, and Responsibilities for Nuclear Safety* (Revision 0, December 1994). ID managers recently completed a review of this document; however, final approval and issuance of this document is being delayed pending further guidance from DOE Headquarters on the status of the DOE-wide Manual of Functions, Assignments, and Responsibilities. The ID manual addresses roles and responsibilities for senior and mid-level ID managers. Although not

ID management has been active in assuring that safety responsibilities are clearly defined and understood.

formally issued, drafts of the ID Manual have been circulated to appropriate ID personnel for review and comment.

Guidance on implementing policies using the matrix management approach is being developed.

As another initiative, ID is preparing a formal, desktop manual that defines the roles and responsibilities and procedures for matrix managers. This document is intended to facilitate implementation of DOE ES&H policy and the INEL mission using the matrix management approach. However, progress on this document has been slow. As an interim measure, selected information pertaining to the ID matrix organization, including roles and responsibilities for matrix, program, and facility managers, is being disseminated to ID personnel via the ID local area network electronic bulletin board. Accelerated development of this manual may help facilitate full acceptance and effective implementation of the matrix concept.

Formal committees have had a positive impact on safety.

There are a number of instances where LMIT has defined roles, responsibilities, and authorities for formal committees. For example, the Safety Analysis Review Team provides a focused group of trained personnel to objectively decide which safety analysis reports should be prioritized for upgrade, based on hazards analyses and on the accuracy of the existing safety analysis report. Some committees that have significant roles in the safety management program, such as the Independent Safety Review Committee and the As Low As Reasonably Achievable (ALARA) Committee, have recently been established and mobilized to prioritize and address issues on a sitewide basis, consistent with LMIT's effort to consolidate such functions.

These committees have had a demonstrable positive impact on safety. For example, the Idaho Chemical Processing Plant Waste Management Authority provides a technically qualified forum for resolving waste minimization and waste characterization issues. The Waste Management Authority is composed of representatives of the major waste management facilities at Idaho Chemical Processing Plant and environmental professionals with experience in chemical engineering and regulatory requirements. They review individual requests for disposal and suggest alternative materials and treatment and disposal methods to ensure that technical waste acceptance criteria are met, improving regulatory compliance and waste minimization. Because of such efforts, Idaho Chemical Processing Plant has achieved a significant reduction in the generation of hazardous and non-hazardous waste.

Oversight at fixed-price waste remediation activities requires attention.

There are three issues at the Radioactive Waste Management Complex (primarily at Pit-9) where confusion was evident and action is warranted:

- LMIT's responsibility for subcontractor safety needs to be better communicated.
- Safety management and Operations Office oversight of fixed-price activities need clarification.
- Safety-related issues were not resolved on a timely basis while organizational conflict of interest questions were being considered.

These areas of confusion could have broader ramifications to other areas and subcontractors if not addressed.

Responsibility for subcontractor safety needs to be better communicated.

Responsibility for subcontractor safety. Confusion was evident among LMIT personnel regarding their role in evaluating and providing technical assistance to subcontractors at the Radioactive Waste Management Complex. Specifically, some LMIT personnel incorrectly indicated that subcontractor activities were not their responsibility. For example, LMIT personnel indicated that the major part of its oversight responsibility was to protect the LMIT workers from unsafe activities performed by subcontractors. There was no similar emphasis regarding the potential impact of LMIT activities on subcontractor workers.

Subcontractors at Pit-9 may have been working in areas with slightly elevated radiation levels. At Pit-9, slightly elevated radiation levels were noted near the work areas, possibly from radioactive materials located in a nearby active storage pit and/or uncovered drums.

Radiation concerns were raised at Pit-9 several years ago. Because the radiation levels were low, the issue did not receive priority attention from LMIT. Another contributing factor to the low priority appears to have been that LMIT personnel did not typically work in the area, and some LMIT personnel did not believe that their responsibilities extended to subcontractors who worked in the area.

The recently established ALARA Committee is now considering the Pit-9 elevated radiation issue. At their direction, some short-term actions (i.e., covering drums) have been implemented while the level of radiation exposure is being determined and the need for additional actions is being evaluated.

The trend toward fixed-price contracts presents new challenges to safety management and oversight.

Safety management and Operations Office oversight of fixed-price activities. As part of an effort to reduce costs and accelerate procurement efforts, ID and LMIT plan to increase the use of fixed-price contracts (rather than cost-plus-fee or time and materials contracts) for subcontracted work. Currently, the Pit-9 waste remediation effort is being conducted under a fixed-price, non-management and operating contract, with special provisions. The Pit-9 fixed-price contract requires the subcontractor to design and construct treatment facilities, clean up specified areas, and meet specified cleanup requirements. The effort is currently in the construction phase.

Although clarification of roles and responsibilities is needed, activities are being conducted safely.

The safety statistics indicate that construction operations at Pit-9 are being conducted in a safe manner. However, the roles and responsibilities of ID and LMIT with regard to management oversight of the safety performance of subcontractors working on the fixed-price activities need to be better defined. Interviews revealed some confusion among ID and LMIT personnel and authorities of the ID Radioactive Waste Management Complex facility management team with respect to day-to-day operations at Pit-9.

The primary concern revolved around the belief that direction provided by DOE or LMIT may have significant cost implications. Several interviewees indicated that shutdowns can be backcharged at $9,000 per hour. Some personnel expressed reluctance to provide direction to the fixed-price contractor to resolve a safety issue that does not clearly constitute a violation of the provision of the existing Health and Safety Plan or a specific requirement of the contract.

ID recognizes that these issues require attention and has recently revised the Radioactive Waste Management Complex Business Management Plan to specifically clarify the roles and responsibilities of the Pit-9 project management team and the Radioactive Waste Management Complex facility management team.

Safety issue resolution while considering conflict of interest. Lockheed Environmental Systems and Technologies Company (LESAT), the subcontractor performing the work, and LMIT are both divisions of the Lockheed-Martin Corporation. Because of this relationship, extensive organizational conflict of interest plans have been developed, and there is a heightened sensitivity by all parties concerned as to how the situation should be monitored. The situation is further complicated by the fact that LESAT has contracted with LMIT to provide some shared services, including selected ES&H services such as fire protection. Thus LMIT is both a client and a customer to LESAT, and vice versa.

Resolution of safety-related issues may be delayed when conflict of interest questions are involved.

The unique contractual arrangements and organizational issues involving Pit-9 are properly subjected to intense scrutiny because of the potential for organizational conflict of interest. LMIT personnel have indicated that providing technical support or resources to LESAT could be construed as "favoritism" and create the appearance of a conflict of interest. ID and LMIT personnel indicate that they have gone to great lengths to assure that no favoritism was shown.

In at least one case, the focus on conflict of interest contributed to delays in resolving a safety concern. Specifically, actions to resolve fire protection concerns required review, resulting in further delays in providing LESAT access to water supplies at the Radioactive Waste Management Complex. Corrective action to address fire water concerns were subject to scrutiny for an extended period while organizational conflict of interest issues were discussed, and various options (e.g., drilling wells and building storage tanks) were considered. In the meantime, the Pit-9 construction support facilities continued to mobilize and expand. These support operations were never determined to be out of compliance with applicable fire protection requirements; however, several construction safety professionals expressed concern for fire protection. During the evaluation, this issue was resolved on an interim basis (through temporary hose connections to the Radioactive Waste Management Complex water supply), but a permanent solution has yet to be implemented.

Criterion 1-3: Project and Resource Management Systems

LMIT, with the encouragement and cooperation of ID and DOE Headquarters, has made significant progress in establishing a new business culture for the site. This is a major undertaking that moves the site from the "level of effort" type contract to one that is "task and work package" oriented. LMIT has developed a comprehensive plan to make this transition. They have developed project and program management processes that include a management control system based on work packages with detailed work breakdown structures. The processes are closely tied to the cost-plus-award-fee and incentive system, and include clear performance measures and indicators in the work packages to ensure quality, adherence to schedules, and cost control.

LMIT's ongoing initiatives have added structure to environment, safety, and health program management.

Within the framework of this transition, ES&H performance was not adversely impacted. In fact, the ongoing initiatives, although not fully implemented, have the potential to strengthen ES&H programs. The new approach is designed to allow the contractor to apply its expertise to ES&H issues, while DOE focuses on establishing goals and monitoring performance, rather than specifying the methods that must be used. Further, streamlined and enhanced procurement practices should make it easier to purchase equipment and services (e.g., tools, dosimeters, safety shoes) promptly and efficiently while considering quality and safety as well as cost.

ID and LMIT managers demonstrated familiarity with the current and potential hazards at INEL facilities, and have shown that they can apply resources and project management techniques to meet both programmatic and ES&H goals. Major projects at INEL, such as D&D activities, are meeting programmatic schedules and are being conducted with a high regard for safety. Movement of spent fuel from the underwater fuel storage facility (CPP-603) north and middle basins to the fuel storage area (CPP-666) is ahead of schedule. Fuel transfer is being performed under a regulatory agreement to meet DOE court-ordered commitments and cost plus incentive fee milestones.

LMIT has handled many complex issues effectively.

These successes are attributable to several factors, including participation of operations, safety, and engineering personnel in analysis of hazards, work planning, and development of operational procedures; mockups for procedural verification and training of operations personnel; experienced and well-trained employees; and strong management commitment to safety. The stable facility missions, relatively current facility (nuclear) safety analysis reports, and generally stable workforce also facilitate effective resource and project planning and execution.

LMIT is standardizing site ES&H policies and consolidating site support functions, such as training, information management, engineering, and ES&H support. The standardization of policies and procedures is an important step in moving toward full implementation of the matrix management concept because consistency across facilities is needed if matrix personnel are to provide support at multiple facilities. When fully

Site environment, safety, and health policies are being standardized.

implemented, the matrix management approach has the potential to increase efficiency by allowing resources to be used where they are most needed to address the highest priority safety concerns.

Procurement reform initiatives can facilitate selecting bidders based on their safety record.

With ID's encouragement, LMIT is in the process of implementing "Best Commercial Procurement Practices." This procurement reform allows LMIT to factor in the bidder's prior work safety performance history in the selection process. As part of this process, LMIT plans to develop and implement a supplier rating system, that will be used to facilitate selection of bidders based on safety performance and other performance measures/indicators. The supplier rating system is intended to enable LMIT to readily identify the previous safety performance and eliminate subcontractors and suppliers that have provided inferior products or services. If properly implemented, this initiative can enhance safety by eliminating bidders that had poor safety records and providing incentives for bidders to enhance their safety programs.

Criterion 1-4: Line Management Accountability for Performance

Individual ES&H performance criteria and the related rewards and sanctions are essential to achieving a safety culture that permeates the entire organization. Although formal mechanisms for assuring accountability through performance evaluations are not uniformly effective, interviews indicated that ID managers recognize that they are responsible and accountable for safety performance, and that the safety performance will be reflected in their performance evaluations.

ID has procedures in place to hold line managers accountable for safety management performance. For instance, program and mission accomplishments for ID facility managers are correlated to the ES&H goals contained in the performance plans for Office of Program Execution Assistant and Deputy Assistant Managers. However, ES&H performance criteria are not well defined for other managers and staff. The performance evaluation methods used for those personnel, such as the "360-degree" evaluations, lack specific criteria for important safety elements, such as worker safety.

Performance criteria for environment, safety, and health are well defined for individual senior managers at ID but not for program managers and staff.

Within LMIT, personnel recognize that they are accountable for ES&H performance, and there are a number of existing mechanisms to track and monitor performance. The senior managers have explicit criteria and incentives for ES&H performance. For example, the ES&H General Manager performance objectives include provisions for a 10 percent reduction in radiation exposure and a 25 percent reduction in the injury/illness index.

LMIT senior managers generally use performance incentives (e.g., awards, contests) and disciplinary actions to emphasize to subordinate managers and employees their accountability for ES&H performance. However, formal mechanisms for assuring ES&H accountability through performance evaluations for mid- and lower-level managers lack clarity and detail. The purpose of safety and health performance clauses and their rating criteria is to provide a measure of accountability for managers' and supervisors' performance in meeting their safety and health responsibilities; LMIT is not fully utilizing this mechanism.

ID and LMIT are in the process of redefining their roles. They are significantly changing the approach to operations office line management, with corresponding changes in roles and responsibilities and accountability for performance. ID is in the process of redefining its role to take an "arms-length" approach, focusing on defining expectations and measuring performance rather than how activities are actually accomplished.

LMIT and ID are in the process of redefining their roles.

Concurrently, as part of the contract reform initiative, LMIT has begun a phased transition from an award fee to an incentive-based performance process, in which the contractor's payment is directly related to specific performance measures (which will include ES&H performance objectives and metrics). Currently ID is using some objective measures to evaluate LMIT's contractual performance as part of the semiannual evaluation and fee determination. To assure a common direction, ID and LMIT are coordinating their strategic plans and are developing a common strategic vision.

Figure 8 shows some of the advantages and potential issues of contract reform as it applies to INEL.

CONTRACT REFORM/PRIVATIZATION

ADVANTAGES	POTENTIAL CONCERNS
• Safety record of subcontractor a selection criteria	• Over-sensitivity to fixed price and potential impact on oversight
• Payment only on successful completion	• New and unfamiliar role for DOE ("stand-back" oversight)
• Incentives based on performance including safety	• Level of DOE and operating contractor oversight not well defined
• ES&H performance indicators built into contracts	• Interfaces and roles, responsibilities, and authorities between DOE - operating contractor and subcontractor not well defined
• DOE focus on oversight of performance	
• Applicable DOE/industry requirements defined	• Safety performance, qualification, and oversight of second tier subcontractors
• Influx of commercial industry safety expertise and experience	• Issues with shared services such as fire protection, water, electricity, security, and emergency planning
• Quality and safety (not just cost) considered in procurement of services and material	
• Safety performance included in operating contractor trending and reporting	
• Increased flexibility for subcontractor to determine how to conduct activities	

Figure 8. Contract Reform Issues as They Apply at INEL

Quantitative measures are used to assess performance.

Objective and quantitative performance measures/indicators are widely used at INEL to assess ES&H performance, as well as operational and cost performance. Examples of ES&H performance indicators are:

- Lost time injuries and accidents
- Personnel radiation exposure
- Safety (injury) cost index
- Number of instances of failure to comply with technical specification limiting conditions for operation
- Corrective maintenance backlog.

Table 1 shows the total recordable case rate (which reflects the total number of instances of injuries and illnesses), the lost/restricted work day case rate (which reflects the number of instances that result in lost or restricted work days), and the lost/restricted work day rate (which reflects the number of lost or restricted days resulting from injury or illness) for INEL over the past three years. For comparison, the corresponding DOE-wide data are shown. The latest available industry-wide and construction-specific case rate data kept by the Bureau of Labor Statistics are also shown for comparison. The D&D program, which has an exemplary safety record, is specifically called out in this table.

Table 1. Case Rate Data

Indicator	D&D (3 yr avg)	INEL-wide (3 yr avg)	DOE-wide (3 yr avg)	BLS-1993 (Ind.-wide)	BLS-1993 (Const. only)
Total Record-able Case Rate	2.0	3.39	3.65	8.9	12.2
Lost/Restricted Work Day Case Rate	1.6	1.54	1.67	3.9	5.5
Lost/Restricted Work Day Rate	6.9	31.9	44.5	- *	- *

* The Bureau of Labor Statistics (BLS) no longer keeps these statistics.

The data in the table suggest that INEL facilities are slightly safer than average DOE facilities. Data from the Auxiliary Reactor Area, where D&D activities are under way, indicate that the safety record is exemplary. However, such statistics must be interpreted with caution and with a full understanding of the validity of the data (which is subject to considerable variation and manipulation).

LMIT tracks performance indicators at each facility and within some organizational elements.

LMIT management tracks performance indicators at each facility and within specific organizational elements to facilitate effective detection and monitoring of negative trends at an early stage. The use of performance indicators, in conjunction with the cost plus incentive fee contract, is a potentially effective mechanism for ensuring that line managers are held accountable for their performance.

The use of these objective and quantitative measures, as opposed to previous reliance on subjective evaluations, is an example of ID and LMIT management's commitment to establish an effective safety management program emphasizing performance and efficiency. However, the use of performance indicators currently varies across the site. In some facilities, performance measures are given a high priority and are tracked and monitored diligently. In other areas, the facility managers view the performance measures as a low priority. If the performance measurement program is to be effective in establishing accountability and improving safety performance, uniformity and active participation will be necessary across the site.

Some existing subcontracts limit LMIT's ability to improve subcontractor performance.

When LMIT assumed responsibility for site operations, it inherited subcontracts that did not have consistent, comprehensive, and enforceable ES&H requirements. These contractual arrangements have contributed to substandard performance (based on accident statistics) by one subcontractor and have limited ID's and LMIT's ability to improve subcontractor performance.

LMIT has taken action to assure that future subcontracts

LMIT has taken action to develop more explicit and rigorous ES&H requirements into its new subcontracts. The new provisions provide guidance to subcontractors on ES&H requirements and include provisions for ES&H reviews during the procurement process. The ES&H reviews provide an opportunity for ES&H specialists to review plans and proposed activities for ES&H concerns and provide input during the procurement process. Such reviews can help identify potential ES&H problems and make modifications as necessary before contracts are finalized.

explicitly address environment, safety, and health requirements.

The new ES&H provisions do not apply to contracts that were in place before the new provisions were developed. To incorporate the new ES&H provisions, such contracts must be modified through negotiations. ID and LMIT are working toward negotiating such modifications. Some existing subcontracts have been modified, while others have not.

One issue involving the contractual accountability of a subcontractor was identified. At the Transuranic Storage Area-Retrieval Enclosure, the contractual arrangements obscure subcontractor management's accountability for safety. This accountability issue has contributed to a situation where one LMIT subcontractor does not consistently meet the same level of performance (based on statistics, such as first aid injuries, lost time accidents) as LMIT employees or LMIT's other subcontractors.

The construction subcontract for Transuranic Storage Area-Retrieval Enclosure obscures accountability for safety.

The construction subcontractor for Transuranic Storage Area-Retrieval Enclosure is required by its contract with LMIT to comply with all Occupational Safety and Health Administration (OSHA) requirements and DOE orders. However, the subcontractor obtains most of its labor force (consisting of ironworkers, electricians, pipefitters, and other crafts people) through a series of subcontracts. The subcontractor does not supply its own skilled labor for construction activities, but provides, directs, and coordinates second-tier subcontractors using a general superintendent and safety engineer reporting to a project manager. Some performance problems (e.g., an increasing rate of injuries) have been evident at Transuranic Storage Area-Retrieval Enclosure. The subcontracting arrangements do not provide assurance that the second-tier subcontracted crafts people comply with all OSHA requirements and DOE orders. Also, with the current arrangement, not all second-tier subcontractor injuries are reflected in the subcontractor's or LMIT's injury rates and thus do not affect their performance evaluation.

There are a number of indications that the Transuranic Storage Area-Retrieval Enclosure subcontractor did not embrace safety management to the same degree as ID, LMIT, and other LMIT subcontractors. For example:

This subcontractor has not responded to certain safety concerns.

- The existing controls did not prevent subcontractors from bringing defective equipment onsite.
- Some workers were not qualified to perform the work they were assigned.
- Second-tier subcontractors are not held to the same DOE or OSHA training and safety standards.
- Field supervisors did not consistently enforce project safety requirements.

Further, the subcontractor managers were uncertain as to their safety responsibilities and reporting relationships, despite the fact that these issues are explained in the subcontractor's safety manual.

Both LMIT and ID have recognized the problems in this area and have taken action to address the situation within the current organizational and contractual framework. LMIT has imposed a corrective action program on the subcontractor and set a deadline for demonstrating improved performance. ID has increased its presence in the area and is conducting additional oversight reviews. However, additional attention is needed to address the root causes; specifically, the current contracts may need to be examined to assure that ES&H issues are adequately addressed and that subcontractor line management can be held accountable for safety performance.

Both LMIT and ID are taking action to address the situation.

Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.

Criterion 2-1: Requirements Management

There are examples of effective requirements management practices within some facilities. For example, some Radioactive Waste Management Complex procedures are specifically linked to requirements documents to facilitate changes.

Some facilities demonstrate effective requirements management practices.

In addition, LMIT has an effective system of researching, identifying, and evaluating new or modified regulations and requirements. Within ID, the Policy Division is the focal point for review of new or revised orders, as well as the interpretation of applicability of requirements to the LMIT contract.

Applicable new or revised orders and other legal requirements are transmitted to the LMIT Regulatory Affairs Office, which is the LMIT focal point for the receipt, identification, and distribution of new and changed

requirements. This office coordinates changes to requirements resulting from detailed searches of the Federal and state regulatory document announcement systems for new or modified regulations. LMIT ES&H staff work closely with the Regulatory Affairs Office to provide technical expertise in interpreting, defining, and assessing the applicability of ES&H requirements. In addition to reviewing applicability, LMIT has a systematic process to review new or modified requirements to determine cost and schedule impacts. Typically, the midyear or annual budget review process is used to address major funding/requirement mismatches that cannot be absorbed in the operating budget.

LMIT is taking steps to integrate requirements management.

LMIT has designed an approach to comprehensive requirements management at INEL. The proposed LMIT system for managing requirements (the Integrated Standards Management Program) is intended to provide a common approach and an integrated system to facilitate tracking and managing existing, new, and modified requirements derived from DOE orders, regulations, safety analysis reports, contractual requirements, subcontractor requirements, or other applicable policies. The system was designed to be consistent with and support Standards Requirement Identification Document (SRID) efforts. The concept, endorsed by ID and LMIT senior management in August 1995, is a positive initiative to establish a standards-based requirements management program.

Better configuration control is needed.

INEL's current approach to requirements management is not consistent across facilities and has some weaknesses. Configuration control mechanisms are not fully developed or consistently effective, as evidenced by instances where the physical configuration was not consistent with documentation and/or procedures. As a result, changes to the physical equipment are not always analyzed or reflected in operating procedures. This can lead to situations where operators may follow procedures that instruct them to operate equipment that may not even be functional. In an emergency condition, such discrepancies can have serious consequences.

Strong oversight is needed as the integrated program develops.

Since the large majority of the applicable requirements are the various "company standards legacy" requirements, rather than new or revised requirements, the rigor applied to the identification of those requirements and documentation of their implementation will be key to the success of this program. Until the Integrated Standards Management Program is implemented, there will continue to be heavy reliance on individuals (i.e., subject matter experts) rather than a systematic, formal method to ensure that all appropriate requirements are addressed. In addition, there is an underlying assumption that current requirements have been incorporated into existing authorization basis documents (safety analysis reports) and existing facility procedures. Because of the numerous and rapid changes that INEL has undergone, strong oversight is necessary to assure that this assumption is valid.

Standardization and consistency in procedures will become increasingly important as matrix management is fully implemented.

Consolidation of program documentation and procedures has been slow. Most of the facilities and ES&H functions are still operating under drafts or procedures and documentation developed by previous contractors. The LMIT *Management Policy Manual* directs LMIT personnel and subcontractors to follow procedures that existed prior to October 1, 1994, until program requirements documents and procedures can be consolidated

and individuals trained to use them. After ten months, standardization and consolidation of plans and procedures have not been completed, and in some instances have only recently been initiated.

The continued use of procedures from the previous five operating contractors is a concern because the procedures may not continue to receive the appropriate reviews or continue to be updated as the new procedure system is developed. Although the reviews at individual facilities indicate that personnel generally understand their procedures and are effectively implementing their safety responsibilities, inconsistent documentation will eventually lead to improper implementation and safety problems. Further, standardization and consistency in procedures will become increasingly important as matrix management is fully implemented and personnel are periodically assigned to different facilities on a routine basis.

The absence of top level programmatic definition documents has hampered the integration process.

The absence of top level programmatic definition documents has been a significant detriment to the integration efforts because it has contributed to delays in finalizing operating procedures and program documentation in a consistent manner. Only one of the documents defining the new system has been approved and disseminated. Some groups decided to proceed with development of LMIT procedures based on their expectations of what the system would require. Some important upper-level programmatic documents were not developed and approved before development of lower-level operational procedures were initiated. Compounding the lack of progress on consolidation efforts is the fact that the existing document control function is dispersed over 23 separate locations and groups sitewide, which are not well coordinated. LMIT has estimated that integration of the document control program and organization could save more than one million dollars annually.

For a safety management program to be effective, it is essential that managers, supervisors, and workers understand the importance of complying with DOE orders and other applicable policies. Three specific concerns were identified with regard to importance of order compliance:

Three concerns were noted with regard to compliance.

- **The direction to "push back" on draft DOE orders has contributed to confusion**. The Associate Deputy Secretary of Field Management (FM) issued a letter challenging the operations offices to aggressively push back on draft DOE orders that were too prescriptive. In turn, ID issued instructions to LMIT not to let overly prescriptive and prohibitive requirements become a burden. These sets of instructions have led to confusion among some ID and LMIT personnel about the applicability and implementation of existing requirements (e.g., the FM guidance specifically addressed draft orders, not orders that had been approved and issued).

- **ID has provided premature direction for implementing the "necessary and sufficient" process.** EM, ID, and LMIT are supportive of the "necessary and sufficient" approach and are eager to participate. In July 1995, ID requested that LMIT establish a work plan for developing a set of "necessary and sufficient" standards. ID

further instructed LMIT to implement the "necessary and sufficient" process by December 1995 and to curtail SRID activities. ID then notified EM that they were using the "necessary and sufficient" process instead of the SRID process. EM replied verbally that the SRID commitment could not be revised to use "necessary and sufficient" activities, because ID did not have formal authority to use "necessary and sufficient" activities. To assure that the necessary management controls are applied, the Assistant Secretary for Environment, Safety and Health provided guidance in a May 5, 1995, letter stating that "any use of the necessary and sufficient process other than the above pilots require authorization by both the Cognizant Secretarial Office and the Assistant Secretary for Environment, Safety and Health." ID and LMIT intend to continue the SRIDs process while concurrently developing the "necessary and sufficient" infrastructure so that they will be prepared to implement the process rapidly after granted approval.

- **There is confusion about "necessary and sufficient" and a perception that compliance with DOE orders is optional.** Interviews with ID and LMIT personnel indicated a perception that DOE order requirements will be less important when the "necessary and sufficient" process is implemented. A programmatic document for the ROVER Uranium Removal Project stated that "All policies, procedures, and DOE orders are negotiable if you can demonstrate a safe means of accomplishing work." It is true that alternatives to DOE order requirements may be instituted under the existing system; however, such changes must be accomplished by extensive review by ID and subsequent modification to the LMIT contract. ID and LMIT should continue to use the periodic update to the applicable orders and requirements clause of the LMIT contract for defining applicable requirements.

Taken together, these three concerns indicate confusion about order compliance on the part of some ID and LMIT personnel. At least part of this confusion can be attributed to misunderstanding of the similarities and differences between SRIDs and "necessary and sufficient." Figure 9 summarizes the two processes (extracted from recent documentation provided by the Department Standards Committee).

"Necessary and Sufficient" and SRIDs*

SRID

Standards Requirements Identification Document (SRID) is the set of requirements that applies to a given job or facility. The SRID process involves comprehensively identifying applicable requirements and source documents as well as the technical bases for those requirements. The SRID process starts with the law, orders, and standards and then analyzes the work and hazards to identify applicable requirements and justify exemptions. The SRID process is under way at many DOE facilities, in accordance with the DOE plan submitted in response to Defense Nuclear Facilities Safety Board Recommendation 90-2.

"Necessary and Sufficient"

The Necessary and Sufficient Closure Process is a disciplined process for creating the set of standards that should govern a particular site, facility, or activity. It begins, not with a "universe" of standards, but with an understanding of the work to be done, the associated hazards, and the means of hazard control. "Necessary and sufficient" begins with the law, work, and hazards and then analyzes the orders and standards to justify applicable requirements. Requirements that are not applicable do not have to be documented and justified. The "necessary and sufficient" approach is being tested at a few selected facilities and activities as part of a carefully controlled pilot program.

* Information extracted from briefing materials developed by the Department Standards Committee.

Figure 9. Two Aspects of Requirements

This confusion on order compliance could lead to decreased sensitivity and relaxation of compliance with current requirements. It is important to ensure that responsible LMIT managers clearly understand and communicate that compliance with DOE requirements is not optional, and that deviations from those requirements must be formally approved. It is also important to ensure that required programs and commitments, such as SRIDs, are not delayed in anticipation of the "necessary and sufficient" program.

Criterion 2-2: Hazards Analysis

Formal hazards analysis and approved authorization basis documents are an essential part of a comprehensive requirements program for nuclear facilities. ID has provided clear guidance and direction to LMIT for the establishment and maintenance of authorization basis documents for hazardous operations and activities, including specific guidance for the preparation of a sitewide implementation plan for DOE Orders 5480.22 and 5480.23, which delineate requirements for technical safety requirements and safety analysis reports.

INEL is well on its way to establishing a comprehensive authorization basis.

Further, ID has devoted attention and resources to maintaining the safety analysis reports for its facilities. Most safety analysis reports at ID have been updated within the past five years, and several were approved within the last two years. Consequently, ID and LMIT are relatively well positioned to modify and update safety analysis reports as necessary to meet the revised requirements of DOE Orders 5480.22 and 5480.23 and mission changes.

Most authorization basis documentation has been approved or submitted for review.

The process used at INEL to develop safety analysis reports is effective, and LMIT has made progress toward the development, completion, and approval of safety analysis report modifications in accordance with DOE Order 5480.23 for many key INEL facilities. With a few exceptions, the authorization basis documents for the major nuclear facilities have been approved or revisions are undergoing review by ID, EM, or NE as applicable. For example, the Radioactive Waste Management Complex Safety Analysis Report was revised to meet DOE Orders 5480.22 and 5480.23 requirements and was recently approved by ID; the updated Advanced Test Reactor Final Safety Analysis Report and the technical safety requirements have been completed and are currently undergoing comment resolution by the NE Safety Analysis Report review team; the plant-wide Idaho Chemical Processing Plant basis of interim operations document has been approved by ID; and the 1994 New Waste Calciner Facility Safety Analysis Report has been revised to meet the DOE Order 5480.23 requirements and is currently undergoing ID review. In addition, LMIT has developed a probabilistic risk assessment for the Advanced Test Reactor. This quantitative risk assessment estimate is an approach to objectively assess the risks associated with Advanced Test Reactor operations.

To meet schedules for remediation in Pit-9, ID, LMIT, and LESAT have bypassed some of the normal steps in the safety analysis review process.

Specifically, ID has reviewed the draft Pit-9 Preliminary Safety Analysis Report and provided comments to LESAT. Following review of the draft preliminary safety analysis report by ID, LMIT provided conditional approval to LESAT to proceed with Pit-9 construction. This approval was coordinated with ID. The health and safety plan and the conditional approval for Pit-9 construction serve as the authorization basis documentation for Pit-9 until the preliminary safety analysis report is submitted and approved by LMIT and DOE. Although not following the normal safety analysis report document review and approval process, these decisions were deemed necessary to meet environmental protection-driven schedules for remediation.

Although much progress has been made, two items need further attention during authorization basis development:

Two items need further attention.

- The review and approval process for the Test Reactor Area portion of the DOE 5480.22 and 5480.23 Implementation Plan has not been timely and lacks rigor and formality. The plan also identified the need to improve some of the basis of interim operation documents.

- The adequacy of the accident analysis calculations and assumptions used to support the new and updated safety analysis reports at the Advanced Test Reactor and Idaho Chemical Processing Plant need to be improved. There are discrepancies between new and existing safety documentation and the as-built conditions, and between safety documentation and the expected operations of systems under postulated design basis accident conditions (discussed further under Criterion 2-4).

The items above indicate a need for increased focus on safety analysis report maintenance and upgrade processes. Although some areas can be improved, INEL is well on its way to establishing comprehensive authorization basis documents that are consistent with new requirements and is appropriately focusing on the highest hazards first.

Facility-level procedures are generally comprehensive, detailed, and reflective of current facility operations. Most procedures are clear and include provisions that enhance safety implementation, such as checklists and provisions for independent verification at key steps in the process. The practice of explicitly linking procedures to the applicable requirements, which is used at the Radioactive Waste Management Complex, facilitates modification of procedures when requirements change. Operational procedures are continually reviewed by both operations and safety personnel to identify hazards and design and implement safe procedures. Operations, safety, and engineering personnel routinely participate in analysis of hazards, work planning, and development of operational procedures, and mockups are used for procedural verification and training of operations personnel. Such practices enhance safety and are commonly implemented at the facility level.

Facility-level procedures are generally comprehensive, detailed, and up to date.

Hazard analysis and procedure development processes are particularly effective within the D&D program. The programmatic framework established by EM and practiced by INEL has been most recently defined in the *Decommissioning Resource Manual, August 1995*. Work planning

The decontamination and decommissioning program exhibited particularly effective processes.

processes that support the D&D activities are defined in the Health and Safety Plan, which establishes operational controls and appropriate safety management actions to ensure worker safety.

Figure 10 presents a number of other examples where effective hazards analysis and work planning enhanced safety.

There were, however, a number of instances where requirements were not identified, had not been adequately analyzed, or were not effectively implemented. These are also shown on Figure 10. Individually, these lapses may not be serious. Collectively, they reveal that the hazards analysis processes is not fully achieving its objectives with regard to identifying potential hazardous situations so that controls can be applied. Failure to fully and consistently identify program requirements could result in the loss of control of radioactive material, the spread of contamination outside of controlled areas, and excessive radiation exposure to personnel.

Criterion 2-3: Implementation of Requirements

Implementation of programs is generally effective.

At the facility level, programs such as radiation protection, waste management, industrial safety, industrial hygiene, construction safety, criticality safety, and process safety are generally implemented in compliance with applicable requirements. Most programs are effective, and a number of significant strengths were identified, as shown in Figure 10.

With the exception of the issues related to the Transuranic Storage Area-Retrieval Enclosure subcontractor (discussed under Criterion 1-4), the performance of LMIT subcontractors reviewed during this evaluation was generally good, as evidenced by low numbers of first aid injuries, lost time accidents, and lost work days. Some notably effective practices were identified with other subcontractors. For example, one Pit-9 subcontractor has an excellent program of incentives and reprimands designed to promote a safety-conscious culture and enhance safety performance. While this subcontractor has only recently begun to mobilize its construction operations at Pit-9, the project manager has an OSHA case summary of 233,000 person-hours without a lost time accident.

EXAMPLES OF EFFECTIVE HAZARDS ANALYSIS AND WORK PLANNING

- The Test Reactor Area has effectively integrated real-time dose tracking into its work control processes through the use of the "Fast Track" electronic dosimetry measurement system. Work package radiation exposure records show that the use of the "Fast Track" system is an innovation that has resulted in reduced personnel radiation exposure on many jobs and at the site in general.
- Idaho Chemical Processing Plant has achieved a significant reduction in the generation of hazardous and non-hazardous waste, and there is a comprehensive waste minimization planning process in place.
- The asbestos control program at Idaho Chemical Processing Plant ensures the minimum potential safety hazard to workers. The asbestos control program features an effective policy to reduce the potential for exposure, trained personnel available to respond anytime to potential concerns, and effective controls over work on asbestos-related tasks.
- Extensive mockup training was conducted for repairs/modification performed earlier this year on systems inside the blend and hold cell at the new waste calcining facility. This training directly resulted in about a factor of ten reduction in the total radiation exposure received during the work.
- Compliance activities for the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response and Compensation Liability Act (CERCLA) are more than sufficient to meet applicable requirements.

EXAMPLES WHERE REQUIREMENTS WERE NOT IDENTIFIED OR IMPLEMENTED

- A change in the procedure for surveying materials for radiological release that exempts materials located outside of a radiological buffer area has no documented technical basis.
- Daily air sampling at the tank farm valve box is not consistent with the Radiation Control Manual, which requires sampling whenever radioactivity levels can fluctuate.
- Streaming radiation experienced during fuel movement at the Idaho Chemical Processing Plant CPP-666 basin may increase the potential for personnel exposure; a requirement for lateral shielding of nuclear fuel had not been developed or implemented, creating the potential for increased radiation exposure and an Unreviewed Safety Question.
- Idaho Chemical Processing Plant has not identified the requirement or implemented a program to inspect loading and unloading areas of treatment, storage, and disposal units daily when they are in use. Failure to perform these inspections exposes INEL to possible enforcement actions.
- The current configuration of the Advanced Test Reactor heating, ventilating, and air conditioning backup dampers and their air supply system was found not to be supported by design basis and operational documents.
- Modifications required to support the design basis seismic qualification of the Advanced Test Reactor fire water injection system piping have not been completed.

Figure 10. Examples of Good Practices and Ineffective Practices

Criterion 2-4: Assessment Programs

Assessment programs are intended to assure that requirements are appropriately implemented.

The compliance assessment program refers to the spectrum of programs (e.g., self-assessments, surveillances, audits, quality assurance, management walk-throughs) implemented by ID and/or LMIT that are designed to determine whether requirements are being implemented as intended.

ID's primary responsibility in this regard is to monitor and evaluate the performance of the contractor. At the facility level, ID line managers ensure and verify contractor compliance through facility representative surveillances, facility manager walk-throughs, appraisals, and surveillances conducted by the ID Assurance Division.

Facility representatives and ID line managers conduct a number of assessment activities.

The facility representatives are assigned through the ID matrix management system and report to the DOE facility managers. They focus primarily on monitoring and assessing safety management performance at the facilities to which they are assigned. This program establishes a visible and continual ID presence at the facilities.

Surveillances are conducted as specified by DOE order requirements and when a need is perceived by the facility managers and by the facility representatives. At the Auxiliary Reactor Area, the DOE facility manager for the D&D sites has made a practice of walking each D&D project weekly and at critical times during D&D activities to ensure that work is being conducted safely.

In addition to activities conducted by ID line managers and facility representatives, the ID Office of Policy Assurance and Resource Management Assurance Division conducts independent appraisals of various functional areas, surveillances of specific activities, and facility observations.

Some aspects of the ID compliance assessment program are not sufficiently formalized or systematic to ensure that all important areas receive appropriate and objective review. Recognizing this, ID recently established a process improvement team to examine the overall role and structure of ID oversight.

ID lacks an effective self-assessment program.

In addition to evaluating contractor safety performance, ID is responsible for assessing its own operations (i.e., self-assessments). ID has not implemented a formal self-assessment program, and has conducted few assessments. The lack of an effective self-assessment program is particularly important in light of the ongoing changes in oversight approach (i.e., to an "arm's length" approach) and the ongoing transition to matrix management. A self-assessment program is one of the keys to determining whether the approaches are functioning as intended and producing the desired results.

LMIT's assessment responsibilities are implemented through a variety of programs, including self-assessments (line managers reviewing and evaluating their own operations) and various independent assessments

(groups not directly responsible for production or operations) conducting assessments of policies, procedures, and/or implementation of facilities or specific functions. The LMIT assessment programs consist of independent assessments and management assessments. Independent assessments are conducted primarily by the Performance Oversight Department of the Quality Assurance and Oversight Branch. The Quality Assurance and Oversight Branch is also responsible for providing programmatic guidance for conducting line management self-assessments.

Some aspects of LMIT assessments are effective.

There are a number of positive aspects to the LMIT assessment programs. For example, risk-based techniques are used to determine the scope and frequency of appraisal activities. Auxiliary Reactor Area and Test Reactor Area line managers were proactive in establishing facility-specific formal self-assessment programs, and acceptance criteria have been developed for each of the Transuranic Storage Area functional areas.

Despite some positive aspects, the LMIT assessment program is not systematic or comprehensive.

However, safety-related audits and self-assessments are not performed on a regular basis. For example, self-assessments of the INEL radiological control program are not fully developed, and few assessments have actually been conducted. Further, the self-assessment program is not comprehensive and has not been established at some facilities. The sitewide guidance on the conduct of self-assessments is currently scheduled to be issued in December 1995. In the interim, performance of self-assessments varies from facility to facility. Self-assessments at the Radioactive Waste Management Complex and the Idaho Chemical Processing Plant have not been conducted or were not completed on schedule.

Neither ID nor LMIT identified certain longstanding deficiencies.

The lack of a systematic and comprehensive compliance assessment approach is a likely contributor to some of the implementation issues identified during this evaluation. The following are two significant examples of failures of the ID and LMIT assessment and issue tracking programs:

- Between 1988 and 1990, Test Reactor Area management committed to the installation of backup confinement isolation dampers in the Advanced Test Reactor ventilation system in response to a DOE technical safety appraisal and DOE's evaluation of the Three Mile Island Accident Review findings and concerns. The backup dampers were installed in 1990, but were never made operational. The action items associated with these commitments were subsequently closed and accepted by ID without the backup dampers ever being operational. There was no documentation justifying reactor operation with the back-up dampers inoperable or the decision not to implement this modification.

- Seismic concerns and modifications associated with the fire water injection system at the Advanced Test Reactor were identified in 1991 but had not been adequately resolved at the time of the inspection. LMIT conducted an assessment of the fire water injection system as a result of the concerns identified during this evaluation. The LMIT assessment determined that this system was inoperable. According to the Advanced Test Reactor technical specifications, the reactor is to be shut down within eight hours when the fire water system is declared inoperable. ID requested an emergency 72-hour extension to the action

statement, and LMIT initiated an expedited modification to correct the deficient condition.

In each of these instances, deficiencies existed for extended periods but were not identified or resolved by quality assurance, self-assessment, independent appraisal, design controls, or engineering reviews by LMIT or ID. ID and LMIT did, however, take aggressive and appropriate action when items were brought to management's attention.

Principle #3 - Competence is commensurate with responsibilities.

Criterion 3-1: Staffing and Qualifications

ID has the necessary experience to evaluate contractor environment, safety, and health performance.

Interviews with ID personnel indicated that, collectively, the ID ES&H staff have formal qualifications and experience in a wide range of safety-related areas and have the necessary technical capabilities to perform evaluations of contractor ES&H performance. The matrix staff is organized to provide support to the various facilities at INEL, and the organizational structure provides an additional degree of flexibility in allocating support resources.

ID has established an effective formal qualification and certification program for facility representatives. The program is well structured and requires the representatives to demonstrate appropriate competencies in nuclear safety. However, requirements for competence in environmental topics were dropped due to difficulties in achieving certification in a timely manner. ID is reinstating the qualification standard for competence in environmental issues and is scheduling appropriate training for the facility representatives. Facility representative staffing is adequate to meet current mission requirements.

Qualification standards are being developed.

Qualification standards for ID personnel other than facility representatives are being developed as part of the ID Technical Qualification Standards Program, which is in the early stages of development. The current program plan exists in final draft form, with approval pending. The plan is responsive to the Department's commitment in response to Defense Nuclear Facilities Safety Board Recommendation 93-3. The ID plan is on schedule. However, a few ID matrix group managers narrowly interpret the qualification standards to apply exclusively to defense nuclear facilities. With this narrow interpretation, matrix resources would not necessarily be required to meet and demonstrate compliance with qualification standards, and thus would not be qualified to work at defense nuclear facilities. This narrow interpretation could limit the flexibility of the matrix approach. ID is continuing to evaluate the applicability of Recommendation 93-3 and is in the process of approving the budget and assigning resources to support its implementation.

Senior managers brought in by LMIT emphasize rigorous and formal approaches to safety.

LMIT has a large cadre of staff with educational and other formal qualifications, as well as extensive experience at the INEL facilities. In addition to experienced managers and staff already in place at INEL, LMIT brought

in over 70 senior managers from member companies. These managers add technical strength in nuclear operations and fresh perspectives on safety management and organizational culture, including a more rigorous and formal approach to safety management and conduct of operations. The capabilities and experience of the "new" managers complement the facility-specific skills and qualifications of the personnel who were on board before LMIT was awarded the contract. The formal and rigorous approach to safety management promulgated by the LMIT management team is already evident in operations.

Staff interviews and reviews of staffing and personnel qualifications indicate that LMIT has enough qualified personnel to perform required safety functions. However, sufficient personnel with the needed backgrounds and skills were not always available in the facilities where they were most needed. For example, of the 18 personnel matrixed from the Environmental Support organization to Idaho Chemical Processing Plant/Test Reactor Area, only one is stationed at the Test Reactor Area.

Staff resources are not always optimally assigned.

There are number of reasons for the mismatches, which are most notable in the areas of environmental protection and radiation control. The first phase of the voluntary reduction program resulted in downsizing technical areas such as engineering and nuclear shift operations. LMIT later recognized that it was facing potential shortages in these skill areas and instituted controls governing the second phase of the downsizing. In addition, resistance to the matrix management approach has hindered the goal of facilitating the timely availability of specialized personnel. Some line managers attempt to retain matrix personnel long after their matrix assignment is finished. Other contributing factors impacting the timely availability of personnel include: lack of coordination among LMIT Human Resources, the INEL Institute, and line management on strategic and tactical staff planning; and current labor relations issues that inhibit resolution of these staff alignment issues.

Both ID and LMIT are committed to the matrix approach.

ID and LMIT management personnel are using informal and formal mechanisms to ensure that the demand for matrix personnel is satisfied expeditiously and in accordance with sitewide priorities. Although some resistance to the matrix concept is evident in both managers and matrix personnel, LMIT and ID management are committed to the matrix approach. To achieve the projected benefits of the matrix approach, senior management must continue to emphasize that movement and sharing of personnel is inevitable and efficient.

LMIT senior management recognized the need to reshape the workforce in accordance with LMIT's strategic plan. Under the direction of the INEL Institute, LMIT developed a plan for workforce restructuring, retraining, and reallocation. A knowledgeable, highly trained professional staff has been assembled, and detailed plans, programs, and procedures are under development. The INEL Institute matrix management approach is well suited to resolution of strategic issues involving staff development and other resource-related issues.

Construction subcontractor training/qualification programs were generally adequate, except for one subcontractor performing construction activities in the Transuranic Storage Area-Retrieval Enclosure. At this facility, apprentice level personnel were being used in lieu of skilled, experienced workers. Apprentices were performing tasks without the direct supervision of qualified journeyman and they did not have prior experience in the work being performed. The use of unqualified workers is a potential contributing factor to the increasing rate of accidents and injuries that occurred at this facility before ID and LMIT initiated corrective actions (as discussed under Criterion 1-4).

Subcontractor training and qualification programs were generally adequate.

Criterion 3-2: Technical Competence and Knowledge of Hazards

ID and LMIT workers and line managers demonstrated understanding and recognition of workplace hazards at INEL. Staff supporting the line organizations in such areas as ES&H, engineering and maintenance, and training demonstrate a similar competence level. LMIT personnel demonstrate competence through participation in a variety of activities, such as dry runs of new procedures. Management procedures, such as the "plan of the day," have been implemented to assure that personnel are aware of potential hazards. Personnel generally demonstrate awareness of the hazards associated with their work and are cognizant of the measures needed to protect against those hazards.

The knowledge of hazards and the worker commitment were particularly notable for the workers on the Auxiliary Reactor Area D&D project. These workers were thoroughly familiar with the hazards (e.g., asbestos, contamination, chemicals, falling objects, demolition) and fully committed to looking out for each other's welfare and safety at the job site.

Notable achievements in the decontamination and decommissioning project are the use of dedicated crews and the development of a manager's handbook.

One reason for this degree of safety awareness is commitment to the use of dedicated crews. ID and LMIT managers have minimized changes of laborers within each crew and moved entire crews from job site to job site, rather than moving individuals from different crews and organizations to perform the work. ID and LMIT indicate that members of a dedicated crew are more apt to understand D&D hazards, procedures, and work practices. This enhancement of the "buddy system" outlined in OSHA requirements represents a successful management approach to ensuring construction safety.

Another contributing factor is the development of an effective tool, the "Decontamination and Dismantlement Program Project Manager's Handbook." This handbook continually updates requirements, references, checklists, and lessons learned for each phase of a D&D project. The handbook was created to increase program efficiency by documenting beneficial practices and previous mistakes, providing quick access to references, and providing details on D&D activities.

Criterion 3-3: Worker Participation and Empowerment

LMIT lacked focus on worker involvement in safety during the first six months of the contract. This was due in part to the considerable effort devoted to transition and consolidation and created a perception on the part of some employees that LMIT was not committed to worker participation in safety. LMIT had recognized this concern and is now focusing on employee involvement, including the implementation of safety committees at various levels and a program to reward safety performance by workers.

Workers are technically capable of responding appropriately to hazards, and management supports the priority of safety over production.

Personnel at all facilities and all levels of the organization demonstrate enthusiasm for and involvement in safety programs. Workers exhibit the technical capability to recognize and respond to workplace hazards, rationally refuse work assignments when appropriate, and have the authority to stop work when necessary. Personnel interviewed indicated that they would not hesitate to stop operations to resolve a safety concern, and several indicated that they had done so on past occasions. The workers' authority and willingness to stop operations without fear of recrimination indicates management's support for and the priority status of safety.

Both operations and safety personnel are actively involved in modifying procedures and job-hazard analyses to enhance safety. For example, operations personnel are involved in procurement efforts, and thus can help assure that safety is considered when purchasing tools and materials. Safety and operational personnel are also involved with procedure development, and thus can identify potential safety concerns or opportunities for safer operations. Similarly, there are effective methods in place that allow workers to expeditiously modify procedures to accommodate health and safety concerns.

Active and ongoing employee involvement in improving protection of workers, the public, and the environment was also evident through safety committees and safety meetings across the site. Both ID and LMIT have employee concerns programs that serve as vehicles for INEL personnel to voice ES&H issues with the understanding that they will be addressed expeditiously, without retribution, while maintaining anonymity.

Criterion 3-4: Training Programs

ID personnel are provided appropriate site-specific training in subjects that are requirements for unescorted facility access, such as radiation protection. They also attend training courses in a variety of general subjects, such as total quality management. Training is also provided through on-the-job training, informal instruction by more senior staff, and attendance at technical courses.

ID training programs have not been founded on a systematic approach.

A systematic approach to training includes job descriptions; job task analysis; analysis of knowledge, skills, and abilities to accomplish the job; comparison with current skill set; and reconciliation through individual development plans and training. Until recently, ID had not embraced such a systematic process, but relied primarily on the experience of ID management and subjective measures ("360-degree" performance evaluation

process and input from matrix managers and their "customers") to identify needed training.

Although ID staff are competent, the existing training program does not provide sufficient assurance that competency will be maintained and that additional competence will be developed to support the strategic vision for INEL. Further, ID management commitment to training programs has been inconsistent, as evidenced by the year-long vacancy in the ID Training Manager position.

ID management recognizes that improvement is needed.

ID training and staff development organizations have recognized that the ID training program requires improvement; they have indicated that they are committed to developing a structured and systematic program and have made progress in defining program direction. However, progress in program implementation has been slow, except in the area of facility representatives' training and certification. Additional attention is needed to assure that the ID training program is brought up to date with current standards and that current and upcoming training needs are systematically identified and addressed. Additional training should be considered for ID managers on the new performance-based approach to contractor management to improve the understanding, acceptance, and implementation of this concept.

The contractor's program is transitioning from facility-specific to sitewide training.

The LMIT training program is undergoing a major transition associated with the integration of the facility-specific programs into a sitewide consolidated program. During this transition, training has continued in compliance-related areas. The existing training programs, which were developed and implemented primarily by the previous contractors, ran the spectrum from excellent to marginal. Facility-specific programs were inconsistent in their approach, and there were some gaps in training (e.g., lack of training in waste management requirements contributed to some compliance issues at Auxiliary Reactor Area).

Although some programs lacked rigor, most facility personnel demonstrated a good understanding of their safety responsibilities and the hazards associated with their workplaces. The experience level of the personnel and the initiative of individual LMIT managers to provide on-the-job and informal training (especially evident in the Idaho Chemical Processing Plant ES&H matrix organization) have generally compensated for current weaknesses in LMIT facility-based training programs. The responsible LMIT personnel (i.e., the INEL Institute Director and LMIT Training Manager) are aware of most of these weaknesses and have taken action to ensure that they are corrected in the new policies and procedures. Further, LMIT has taken aggressive action to develop effective program management processes to ensure that program weaknesses are corrected in a timely fashion.

LMIT has developed a systematic process for managing the consolidated training program.

The LMIT Training Organization is performing its mission adequately and has developed a systematic program management process to ensure that the consolidated training program is developed and implemented. Major milestones in the training plans are being met. Substantial progress has been made in developing policies and procedures for the consolidated program.

Review of these documents indicates that they are comprehensive and well written, and provide a sound basis for the planned training program.

4.0 CONCLUSIONS AND RATINGS

Conclusions and ratings are organized according to the three guiding principles.

The major conclusions and ratings from the review of the INEL safety management program are discussed in this section and are organized according to the guiding principles. These conclusions and ratings are based on the evaluation results presented in Section 3 and are most applicable to the specific facilities within the scope of this review. However, because the facilities and activities selected for evaluation represent a diverse cross section of the site, the conclusions and ratings are indicative of the overall INEL safety management program.

EVALUATION APPROACH

The principles are applied with careful consideration of their implications for specific activities and facilities.

Each of the guiding principles that constitute the basis for establishing an effective safety management program is a crucial element in ensuring that DOE-controlled operations are performed in a manner that will protect workers, the public, and the environment. Using these principles and their associated criteria to evaluate safety management program effectiveness requires careful consideration of the nature of the specific activity or facility being reviewed, its relationship to and impact on other activities and facilities, its life cycle phase, and the risk it presents to ES&H goals.

While the significance and application of each principle and its associated criteria may vary by circumstance, it is imperative that the implications of each principle for effective safety management be weighed and considered on the basis of hazards and risks to workers, the public, and the environment.

The guiding principles are interrelated and mutually supportive elements of the overall safety management system. Clear articulation and communication of lines of authority and responsibility for safety must consider and correlate to the establishment and implementation of appropriate requirements; personnel responsible for execution of these requirements must understand the hazards and their roles in controlling the hazards, and must be competent to perform their assigned duties. Hence, the evaluation of the safety management system must consider the guiding principles both individually and in concert.

Evaluations of specific criteria are "rolled up" to evaluate the associated principle.

The process for evaluating the effectiveness of the implementation of each guiding principle and the overall INEL safety management program is depicted in Figure 11. First, the inspection results (the observations and findings presented in Section 3 and Appendix A) are sorted and binned according to the individual criteria. Next, each guiding principle is evaluated and rated by considering the individual criteria under each principle both individually and collectively—that is, the evaluations of individual criteria results are "rolled up" to a higher level evaluation of the individual guiding principles. Finally, the overall safety management program is evaluated and rated by "rolling up" the evaluation of the individual guiding principles.

The rollup process is not a mechanical or numerical scoring. Rather, it is a deliberative process involving all levels of the Oversight evaluation team, from the inspectors who examine individual facilities and topics to Evaluation Team management and the Deputy Assistant Secretary for Oversight. The rollup evaluations consider the following factors:

- Whether risks to ES&H currently exist or will exist in the future if present circumstances remain unchecked

Figure 11

- Whether the risks are unique to a specific criterion, principle, activity, or facility
- The synergistic effects of two or more principles or criteria
- Initiatives that are in progress or are planned, and their expected results
- The impact that the level of adherence to a specific principle or criterion has on the effectiveness of the overall safety management program.

In practice, the evaluation process involves a number of iterations to assure that the results are valid and representative of the INEL safety management program.

At all stages of the process, the preliminary results are shared with representatives of INEL. Their comments on the factual accuracy and completeness of the data are used to determine the validity of the data and guide additional data collection efforts as appropriate.

The ratings for each of the guiding principles and the overall safety management program are graphically presented using the color rating scheme. The ratings should not to be used as a relative rating between sites or facilities because of the many differences in missions, hazards, and facility and activity life cycles.

Principle #1: Line managers are responsible and accountable for safety.

Line management performance is generally effective, although documentation is lacking in some areas.

ID and LMIT personnel are in various stages of implementing a safety management program that is based on sound management principles. Some aspects of performance, most notably the D&D efforts, are particularly effective. Most of the issues identified under this principle are characterized as failures to maintain formal documentation, such as the lack of formal criteria for evaluating individual performance. These failures require attention but did not directly jeopardize safety at INEL.

The significant issues involve subcontractor management and oversight.

The issues relating to management and oversight of subcontractor performance were more significant. At Pit-9, the operations are being conducted in a safe manner, but the confusion over responsibilities for monitoring, evaluating, and assisting subcontractors led to delays in resolving potential safety concerns. At Transuranic Storage Area-Retrieval Enclosure, the responsibilities and accountability for ES&H performance were obscured by contractual issues, contributing to a situation where a subcontractor had an increased number of accidents. Both ID and LMIT recognized the problems at Transuranic Storage Area-Retrieval Enclosure through their assessment systems and took appropriate actions to correct them.

INEL performance in this area is generally good.

Although some issues were identified, INEL performance with respect to the individual criteria under this principle is generally good. Safety policy and goals have been established and clearly articulated and communicated. With the noted exception at Pit-9, responsibilities and authorities are clearly defined, and line managers accept, understand, and diligently execute their

responsibilities. Project and resource management systems are functioning effectively and improving in the face of significant challenges associated with contract transition. Line managers are held accountable for ES&H performance, and both ID and LMIT are judiciously using performance measures as a tool for monitoring and evaluating performance.

Overall, line management is meeting the intent of this principle—ID and LMIT line managers recognize, accept, and understand their responsibility and accountability for safety. The identified issues, although deserving attention, did not significantly impact safety performance or are being addressed by INEL management.

Overall, line management understands and accepts their responsibilities for safety.

Rating: Acceptable performance (green)

Principle #2: Comprehensive requirements exist, are appropriate, and are executed.

INEL programs for assuring that comprehensive requirements are established and implemented have some positive features but are neither mature nor uniformly effective. Implementation of identified ES&H requirements at individual facilities is generally good, and some individual programs, such as radiation protection and asbestos abatement, are particularly effective.

Generally, requirements are effectively implemented at individual facilities.

Within the other three criteria, there are significant positive aspects, such as the facility representative program, safety analysis report processes, and detailed facility-specific procedures. However, there are weaknesses in these criteria that require improvement. The delays in achieving a uniform and consistent set of ES&H policies and procedures and the confusion over applicability of requirements are largely administrative problems but could become significant if not corrected.

The most significant issues identified on this evaluation involved failures to identify, analyze, control, or resolve potentially hazardous conditions—that is, the hazards analysis process is not fully effective. The two problems identified in essential systems at the Advanced Test Reactor and the fuel transfer problems at Idaho Chemical Processing Plant are the most significant concerns in this regard. Also, the independent review of safety documentation and validation of facility condition is not consistently performed, and thus potential issues were not identified by ID or LMIT.

The hazards analysis process is not fully effective.

Although there are some effective aspects, the ID and LMIT assessment programs are not systematic and do not assure comprehensive coverage, and the self-assessment programs are deficient at both ID and LMIT. Weaknesses in these programs contributed to the failure to identify potentially hazardous conditions.

Overall, INEL has the basic elements of an effective system in place but the integration of those elements is not uniformly effective. The identified issues, although not serious or pervasive weaknesses, resulted in some significant safety issues that have "fallen through the cracks."

Overall, improvement is needed to assure that safety issues are addressed.

Rating: Improvement needed (yellow)

Principle #3: Competence is commensurate with responsibilities.

Collectively, INEL personnel possess skills, knowledge, and competence commensurate with the responsibilities and site hazards, and appropriate to the successful execution of sitewide activities and mission. ID is staffed with experienced managers who are knowledgeable of and actively involved in facility operations and safety.

In the aggregate, ID and LMIT staff levels and technical skills meet the current safety management needs of INEL. However, weaknesses in the current training programs limit the ability to assure the availability of appropriate staff at the facility and program level, even though the overall staff skill mix is appropriate.

ID and LMIT personnel have the necessary skills and knowledge to manage safety programs.

LMIT is in the process of addressing this situation and consolidating the various facilities' training programs, which vary in effectiveness. LMIT's approach to the consolidation effort is systematic and well thought out. ID's progress toward improving its training program has been slow, although implementation of ID's response to Defense Nuclear Facilities Safety Board Recommendation 93-3 is on schedule. There has been a general absence of management support and strategic direction for ID training programs. While this has not hindered ID's ability to effectively execute its current responsibilities for safety management, there is a potential impact on future mission activities.

Overall, INEL meets the intent of this principle. ID and LMIT workers and line managers are knowledgeable, experienced, and actively involved in safety management at INEL. Workers are capable of recognizing workplace hazards and recognize their authority and responsibility to stop work where necessary to protect personnel and the environment.

Overall performance in this area is acceptable.

Rating: Acceptable performance (green)

Overall Safety Management Program

The overall safety management program is performing at an acceptable level.

Sitewide operations at INEL are being performed in a manner that minimizes risks to the safety and health of workers, the public, and the environment. The foundation for a safety management program that meets the guiding principles has been established. Plans for this program have been developed, and implementation is progressing. Activities to reduce site hazards and vulnerabilities, including those associated with D&D and the recovery of spent fuel, are being aggressively pursued.

Weaknesses in LMIT consolidation of sitewide procedures and training, ID training, upgrades to facility authorization bases, clarifications on DOE order compliance, and oversight and assessment roles and responsibilities are mitigated by aggressive ID and LMIT management and their involvement in safety, as well as the competence and involvement of the experienced workforce in reacting to site hazards.

Rating: Acceptable performance (green)

The most significant evaluation findings and the ratings are summarized in Figures 12 and 13.

5.0 CANDIDATE ACTIONS FOR ENHANCING THE INEL SAFETY MANAGEMENT PROGRAM

This section presents candidate improvement actions offered for consideration, organized according to the guiding principles. These considerations, upon integration, can provide important enhancements to the current INEL safety management program. Certain of these actions are particularly important to ongoing consolidation and planning initiatives already under way by LMIT. The candidate actions presented below are offered for consideration by EM, NE, ID, and LMIT personnel.

Principle—Line managers are responsible and accountable for safety.

- Organizational roles and responsibilities for LMIT personnel should be formally defined, documented, and communicated to all staff.

- Management should more effectively communicate its vision, goals, and objectives to site personnel, with emphasis on consolidation efforts, implementation of plans, performance expectations, and flexibility of the matrix management concept.

OVERVIEW OF EVALUATION RESULTS

POSITIVE ATTRIBUTES	OPPORTUNITIES FOR IMPROVEMENT
Principle #1 - Line managers are responsible and accountable for safety.	
Roles, Responsibilities, Authorities Clearly Defined and Understood	Oversight of Subcontractor Safety Performance
Development and Implementation of Site-Specific Functions, Assignments, and Responsibilities Manual	Communication of Goals, Objectives, and Mission to all Levels of the Organization
Pervasive Safety-Conscious Workforce	ID and LMIT Self-Assessment Programs Not Established and Functioning
Effective Use of Performance Measures	
Commitment to Voluntary Protection Program	
Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.	
Process for Identification of New Requirements and Applicability	Consolidation of Programs and Procedures
RCRA/CERCLA Compliance	Control of Modifications to Safety Related Systems
Implementation Plan for Authorization Basis Upgrades	Engineering Analysis and Independent Review
Strong Facility Safety Management Programs	Clarification and Coordination of Policy on Order Compliance
Principle #3 - Competence is commensurate with responsibilities.	
Worker Involvement in Safety	ID's Implementation of Defense Nuclear Facilities Safety Board Recommendation 93-3
INEL Institute and Strategic Approach to Training	
Management and Staff Competence and Experience	Implementation of Training at the Facility Level
Excellent D&D Safety Record	
Overall Safety Management	
ID and LMIT Management, Experienced, Competent, and Actively Involved	Historical Weakness in Engineering, Issues Management, and Oversight
Strong Managers Compensating for Incomplete Consolidation and Institutionalization	Acceleration of Consolidation Effort
Excellent ID-LMIT Communications and Cooperation	Clarification of Order Compliance Policy
Evidence of a Strong and Improving Safety-Conscious Workforce	
Exemplary Decontamination and Decommissioning Program	

Figure 12. Overview of Results

Figure 13

- The appropriate level of LMIT and ID oversight of ES&H performance by LESAT and subcontractors at Pit-9 should be fully defined and clearly communicated.

- Management should consider incorporating specific ES&H criteria in the performance appraisals for managers at all levels of the organization. Also, incorporating teamwork evaluation criteria in performance appraisals for both ID and LMIT personnel may help provide strong incentives and break down resistance to the matrix approach.

- The formal desktop manual for ID matrix group managers is an important tool, and its development should be accelerated.

- Current subcontracts should be examined to ensure that ES&H issues are adequately addressed and that subcontractor line management can be held accountable for performance.

Principle—Comprehensive requirements exist, are appropriate, and are executed.

- A comprehensive analysis of the circumstances surrounding the uncompleted modifications to safety systems in the Advanced Test Reactor and the inadequate hazards analysis for fuel movement in Idaho Chemical Processing Plant-666 should be conducted to determine weaknesses in design control, engineering analysis, quality assurance, and issues management.

- The outdated safety analysis report for ROVER, which was developed for an operational facility, in combination with the planned safety assessments to be developed for its deactivation, should consider the full spectrum of accidents (worker safety during deactivation), interdependencies of shared systems (e.g., common ventilation systems), and the effects of aging and degradation on equipment operability and reliability.

- The coordination among DOE Headquarters, ID, and LMIT in defining and implementing the "necessary and sufficient" approach versus SRIDs should be addressed and a clear course of action charted to eliminate false starts and unnecessary expenditure of funds. Full implementation of all applicable DOE and industry requirements should be reinforced in the interim through policy direction and training, including training for LMIT senior managers in DOE requirements.

- ID and LMIT management should move proactively and aggressively to ensure that the sitewide procedure consolidation process and the integrated requirements management system are efficiently and effectively implemented.

- The hazards analysis and authorization basis program at INEL should receive increased management attention. The independent review

process for safety documentation and validation of facility conditions should be strengthened.

- Both the ID and LMIT self-assessment programs should be formalized and revitalized to enhance line managers' ability to identify their own weaknesses and take early corrective actions.

Principle—Competence is commensurate with responsibilities.

- Additional training should be considered for LMIT and ID managers, including DOE orders and requirements for new LMIT managers, "arms-length" oversight for ID managers, and partnering with the union on ES&H, including conflict resolution.

- Strategic staffing plans that identify the skills needed to support activities in the LMIT/ID site strategic plans could be developed, and LMIT and ID training plans could be integrated to leverage the capabilities and efficiencies of the INEL Institute to compensate for identified skills and competency mismatches and shortfalls.

- ID training initiatives, including ID response to Defense Nuclear Facilities Safety Board Recommendation 93-3, should be prioritized, funded, and implemented.

- The aggressive implementation of the INEL Institute training consolidation activities should be continued.

- Position-specific training for LMIT and ID matrix managers should be identified, developed, and implemented to help ensure that position expectations and performance are consistent.

APPENDIX A

FACILITY SAFETY MANAGEMENT EVALUATION REPORTS

APPENDIX A

FACILITY SAFETY MANAGEMENT EVALUATION REPORTS

INTRODUCTION

The independent oversight evaluation of environment, safety, and health (ES&H) programs at the Idaho National Engineering Laboratory (INEL) focused on safety management systems as measured by the three guiding principles of safety management, which provide the structure for the evaluation report. During the evaluation process, information about the individual facilities was collated and analyzed. This appendix presents the results for each facility:

- Radioactive Waste Management Complex (RWMC), which includes Pit-9
- Auxiliary Reactor Area (ARA)
- Test Reactor Area (TRA)
- Idaho Chemical Processing Plant (ICPP).

The data collection efforts for specific facilities focused on specific topics, as indicated in Table A-1.

All four of the facility evaluations follow the same format. The first section provides a summary, which provides an overall perspective of the facility safety management system. The second section provides background information about the facility, such as ongoing operations and significant hazards. The third and fourth sections identify the major strengths and weaknesses, respectively, noted during the evaluation, with an emphasis on a management perspective. The fifth section provides an assessment of each of the four major elements of a management system: policy, organization, planning and implementation, and performance evaluation. The assessment of each management element is based on criteria derived from, and linked to, the guiding principles, as presented in Table A-2. In the main report, the results for the individual facilities are considered with the data collected by the management teams to form an overall assessment of management's performance with respect to the guiding principles throughout INEL from a broad perspective. This appendix provides more detail about each facility and supports conclusions made in the report.

Table A-1. Topics Evaluated at Selected INEL Facilities

TOPICS	FACILITIES			
	RWMC/Pit-9	ARA	TRA	ICPP
Radiation Protection	●	●	●	●
Waste Management	●	●	●	●
Industrial Safety	●	●	●	●
Industrial Hygiene	●	●		
Construction Safety	●	●		●
Process Safety				●
Criticality Safety/Authorization Basis			●	●
Essential Systems			●	●

KEY: ● Topic evaluated at facility

Table A-2. Guiding Principles and Applicable Criteria

EVALUATION CRITERIA	**GUIDING PRINCIPLES OF SAFETY MANAGEMENT**		
	Guiding Principle #1	**Guiding Principle #2**	**Guiding Principle #3**
MANAGEMENT ELEMENT	**Line managers are responsible and accountable for safety.**	**Comprehensive requirements exist, are appropriate, and are executed.**	**Competence is commensurate with responsibility.**
Policy	Line management implements effective safety policy and goals that reflect Departmental and industry policies and standards and assure a safety culture that permeates every level of the organization.	Hazards generally change as a facility cycles through the phases of design, construction, operation and maintenance, decommissioning and decontamination, and environmental restoration. It is thus important to continually analyze and assess hazards in order to identify the relative significance and application of Department requirements.	Line managers must establish and implement processes to ensure the effectiveness of training programs in measuring and improving performance and in identifying additional training needs, and to ensure continued competence commensurate with responsibilities.

Organization	Line managers are responsible and accountable for ensuring that DOE facility operations and work practices are performed in a manner that provides adequate protection to worker safety and health, the public, and the environment.	Responsibilities and accountabilities must be clearly defined to ensure that requirements are identified, transmitted, and implemented, and that they provide adequate protection to worker safety and health, the public, and the environment.	The organization supports effective safety management and appropriate levels of staffing and competence at every level.
Planning and Implementation	Decision makers at appropriate levels of the organization must be capable of understanding and synthesizing program goals and ES&H risks in order to effectively deploy resources adequate to address both. Line managers must manage safety and its attainment by establishing management information systems.	Line managers are responsible for ensuring that contractors comply with these requirements and that compliance is verified by DOE management.	Workers and managers are technically competent to perform their jobs and are appropriately educated and knowledgeable of the hazards associated with site operations.
Performance Evaluation	Line managers are accountable for ES&H performance. Performance should be explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers must execute actions to attain and continuously improve the safety of their operations.	Line management must establish and implement effective methodologies to monitor, review, and evaluate adherence to all applicable Departmental requirements and industry standards for safety and to achieve timely correction where warranted.	Potential hazards associated with operations dictate that DOE and contractor workers possess technical competence, commitment, discipline, and high standards of professional excellence. Line managers recognize that active participation by workers is essential in maintaining and improving protection of worker safety and health, the public, and the environment.

RADIOACTIVE WASTE MANAGEMENT COMPLEX/PIT-9

SUMMARY

The safety management program at RWMC is generally effective, as evidenced by the safety performance records (e.g., low injury rates and compliance with environmental protection requirements) of Lockheed-Martin Idaho Technology Company (LMIT) and most of its subcontractors. The Department of Energy (DOE) Idaho Operations Office (ID) and LMIT line managers are aware of and committed to executing their safety responsibilities, and employee involvement and concern for safety are notable.

A number of positive measures, such as work planning, to promote safety have been implemented, and safety-related documentation and procedures are comprehensive and effectively used. With few exceptions, requirements have been identified and translated into effective operational procedures, which are continually reviewed by both operations and safety personnel to identify enhancements to safety. Although some weaknesses were noted, most are isolated instances in an otherwise effective program and have not had a significant impact on safety at RWMC.

However, the programs to monitor, review, and evaluate construction subcontractor safety performance are not fully implemented and are not consistently effective in one of the operations, the Transuranic Storage Area - Retrieval Enclosure (TSA-RE). At that operation, subcontractor performance was degraded, resulting in a higher rate of injuries. A number of factors contributed to this situation, including organizational and contractual issues and a reluctance on the part of one subcontractor to fully embrace a safety culture. Both LMIT and ID have recognized the problem and have implemented corrective actions. For example, LMIT has required the subcontractor to develop a program designed to improve worker safety, and ID has increased its audits in that area. The subcontractor safety management issue requires continued attention to assure that safety priorities are communicated to, understood by, and fully accepted and supported by all organizations in the chain down to the workers performing construction.

The RWMC safety management program could also benefit from better planning, including systematic identification of performance evaluation goals and methods for achieving those goals. Although programs are in place and generally functioning, they lack structure and systematic approaches, relying primarily on the experience and capabilities of individuals.

BACKGROUND

The RWMC has received a variety of low-level, mixed, and transuranic wastes for storage in burial grounds, retrievable storage pads, and enclosed storage facilities. Burial ground operations commenced in the early 1950s, and the oldest permanent building at the RWMC was constructed in 1974. Additionally, there are several waste remediation projects on site. The Waste Storage Facility (WSF) is under construction to replace the existing Certified and Segregated Waste Storage Building (also known as the Air Support Building). The WSF consists of eight pre-fabricated metal buildings for receipt of certified waste from the C&S Waste Storage Building. Three WSF buildings are operational and five are in various stages of construction. The WSF also includes an upgrade to the Drum Venting Facility located adjacent to the RWMC Stored Waste Examination Pilot Plant (SWEPP).

The principal environmental hazard at RWMC is buried hazardous and radioactive (mixed) transuranic waste, which could potentially leak to the environment. Other hazards result from the ongoing handling of radioactive and hazardous wastes and construction activities. Issues specific to RWMC previously identified through Headquarters reviews, ID assessments, and various other sources include deficiencies in fire protection and construction safety activities. Site preparation and foundation work for Pit-9 remediation has been initiated. Hazardous material and mixed waste have been identified in the soil and saturated water zones below the RWMC burial grounds; these wastes will be subject to remediation actions.

The topics reviewed were radiation protection, waste management, industrial safety, industrial hygiene, and construction safety. In addition to the issues identified in the Evaluation Plan, an area of focus

was the ID and contractor oversight of the safety management of the "privatized" activities at Pit-9. Although commonly referred to as privatized by the Office of Environmental Management (EM), ID, and LMIT, the activities have been determined by ID and LMIT to be properly characterized as a fixed-price, non-M&O (management and operating) contract, for waste management services.

The Pit-9 waste remediation effort is being conducted under a fixed-price contract as part of an initiative to reduce costs and accelerate cleanup efforts. The fixed-price contract requires the subcontractor to perform specific functions and meet specified cleanup requirements. The subcontractor performing the privatized fixed-price work, Lockheed-Martin Environmental Systems and Technologies Company (LESAT), has an organizational relationship to LMIT; both are divisions of the Lockheed-Martin Corporation. Because of this relationship, extensive organizational conflict of interest plans have been developed, and there is an increased level of attention by ID and all parties concerned to monitoring the situation.

ID has overall responsibility for providing direction to LMIT, which has responsibility for day-to-day operations at RWMC and Pit-9. In addition to ID and LMIT, a number of subcontractors perform work at RWMC/Pit-9.

POSITIVE ATTRIBUTES

■ **Employee involvement and concern for safety are notable.** RWMC and Pit-9 personnel at all levels of the organization demonstrated enthusiasm for and involvement in safety programs. Personnel interviewed indicated that they would have no hesitation in stopping operations to resolve a safety concern, and several indicated that they had done so on past occasions. The workers' authority and willingness to stop operations without fear of recrimination indicates management's support for safety and demonstrates the priority of safety over production.

■ **Management has implemented a number of positive measures to promote safety.** Management procedures, such as the "plan of the day," have been implemented to assure communications between the organizations and enhance safe operations. Also, walkthroughs and dry runs are routinely performed prior to engaging in new activities. Both operations personnel and safety personnel are actively involved in modifying procedures and job-hazard analysis to enhance safety. For example, SWEPP operators are involved in procurement efforts, and thus have an opportunity to assure that safety is considered when purchasing tools and materials (although "low-bidder" considerations sometimes have preempted safety considerations). Operators are also involved with procedure development, and thus can identify potential safety concerns or opportunities for safer operations as new procedures are developed or old ones modified. Similarly, there are effective methods in place that allow workers to expeditiously modify procedures to accommodate health and safety concerns.

■ **Safety-related documentation and procedures are comprehensive, current, useful, and utilized.** A particular strength is the practice of explicitly linking procedures to the applicable requirements. This approach facilitates modification of procedures when requirements change. The ID RWMC "Business Management Plan" is an example of effective documentation; it clearly specifies the roles and responsibilities of ID personnel in various positions, including their safety management responsibilities.

■ **With few exceptions, the safety management documentation and procedures have translated to effective implementation.** For example, drum transfer operations from the Certified and Segregated Waste Storage Building to the WSF use detailed procedures (including checklists and independent verification at key steps in the process) and are performed in such a manner as to ensure that safety, environmental protection, and radiation control requirements are met.

■ **RWMC and Pit-9 projects required under specific regulatory agreements are on schedule to meet DOE commitments to environmental protection.** INEL has implemented an effective waste reconfiguration operation at RWMC to transfer drums containing radioactive waste to newly constructed compliant storage. The Pit-9 comprehensive demonstration project is a new approach to providing data to support remediation of other pits at RWMC, to meet Federal Facility Agreement/Consent Order milestones, and to demonstrate the capabilities of existing technology. It is also a unique and innovative approach to contracting to the private sector, because of the

financial incentives and risks associated with the fixed-price contract. These issues are not currently addressed in the defined roles and responsibilities for oversight of restoration projects.

WEAKNESSES

■ **The programs to monitor, review, and evaluate construction subcontractor safety performance are not fully implemented and are not consistently effective in one of the operations at RWMC.** Work activities at the TSA-RE are implemented by various union crafts personnel (e.g., electrical workers, steel workers, pipefitters). These activities are coordinated and directed by a LMIT subcontractor. At TSA-RE, the LMIT subcontractors do not consistently meet the same standards of performance as LMIT employees or LMIT's other subcontractors. For example, at TSA-RE, controls do not prevent subcontractors from using defective equipment; some construction workers are not qualified to perform the work they are assigned (e.g., apprentice iron workers are performing sheet metal work); and the roles of the safety supervisor, project manager, and general superintendent are not clearly defined with respect to subcontractor performance. Although subcontractor performance in construction safety remains an issue, both LMIT and ID have recognized the issue and taken action. LMIT has recognized weaknesses in the TSA-RE subcontractor's safety management program and, as a result of recent increases in safety incidents at the TSA-RE, has required the subcontractor to develop a program to improve worker safety.

■ **Safety management programs covering the privatized work at Pit-9 are hindered by organizational and technical resource issues.** Specifically, the subcontractor (LESAT) coordinating and directing work in Pit-9 does not presently have technical personnel at the Pit-9 site who are qualified to evaluate the environmental impacts of construction operations; the LMIT environmental engineer has not been certified for unescorted access to the entire Pit-9 area; and the roles, responsibilities, and authorities of the ID RWMC facility management team with respect to day-to-day operations at Pit-9 have not been specified and clearly communicated. Some of these issues are complicated by the unique contractual arrangements, which involve a subcontractor that has an organizational relationship to the prime contractor performing work on a fixed-price contract.

■ **Safety and industrial hygiene support to RWMC operations are not meeting plans.** Work packages for safety and industrial hygiene personnel indicate they should spend about 75 percent of their time on the "plant floor" to provide the required level of support. In practice, those personnel indicate that they spend only about 15 to 20 percent of their time on the plant floor because of the administrative paperwork burden.

ASSESSMENT OF MANAGEMENT ELEMENTS

Policy

For the most part, ID and LMIT have implemented an effective safety policy and goals at RWMC. With few exceptions, the policies and goals reflect Departmental and industry policies and standards, and some aspects of the safety management policy are notable. For example, line management support has contributed to a safety conscious workforce, and a strong "safety culture" is evident throughout most of the workforce. However, as noted for TSA-RE, the strong safety culture does not extend to all subcontractors uniformly.

RWMC facilities are in various life cycle stages, including design, construction, and operations. Although some anomalies were evident, in most cases requirements have been established that are commensurate with hazards. ID line managers are ensuring and verifying contractor compliance through a variety of programs; however, some aspects of the program are not sufficiently formalized or systematic. Processes to ensure the effectiveness of training programs and identify additional training needs are currently lacking on a sitewide basis. Consistent with the integrated approach adopted by LMIT, this weakness is being addressed through a sitewide program. Although weaknesses in the sitewide training program are evident at RWMC, personnel at the facility generally demonstrate an understanding of the safety aspects of their jobs and demonstrate competence through participation in a variety of activities, such as dry runs of new procedures.

Although LMIT managers have demonstrated their commitment to safety, the formal mechanisms for assuring accountability through performance evaluations can be improved. The purpose of safety and health performance clauses and their rating

criteria is to provide a measure of accountability for managers' and supervisors' performance in meeting their safety and health responsibilities. LMIT managers and supervisors do not have well-defined safety and health performance clauses in their rating plans, and LMIT radiological control managers do not have position descriptions or performance appraisal criteria yet. Individuals within the organization seem to have a good understanding of their responsibilities, but no mechanism is in place to ensure that line radiological control managers are accountable for radiation protection. Also, ID project managers indicated that the 24 criteria used for evaluating the project managers in the "360-degree" review process lacked evaluation criteria specifically dealing with worker safety. The general construction management contractor at Pit-9 has a notable program of incentives and reprimands for promoting a safety conscious culture and enhancing safety performance. While that subcontractor has only recently begun to mobilize its construction operations at Pit-9, the project manager has an Occupational Safety and Health Administration (OSHA) case summary of 233,000 person-hours without a lost time accident.

Although most aspects of policy have been effectively communicated, some clarification of DOE's policy on the fixed-price Pit-9 project may be prudent, particularly with respect to ID's ES&H oversight role. None of the responsible organizations (EM, ID, or LMIT) have developed formal specific ES&H policy guidance on handling the unique contractual aspects of the fixed-price project. As a result, roles and responsibilities for managing the Pit-9 project were not defined at the LMIT and LESAT levels before the construction phase began. During interviews, managers expressed some confusion about the role of oversight in a fixed-price effort for waste treatment services, in which any direction provided by DOE that is not strictly within the contractual parameters may have significant cost implications (e.g., several interviewees indicated that shutdowns can be backcharged at $9,000 per hour). Clarification of this issue, through a clear policy statement, may serve to avoid confusion in the future. ID reported that they were revising the RWMC Business Management Plan to address the interface between the Pit-9 project management team and the RWMC facility management team.

Organization

The consolidation of INEL activities has resulted in ongoing efforts to centralize and promote consistency among a number of functions, such as training, hazards analysis, planning, requirements identification, and procedure development. Many of these initiatives show promise but are not yet fully implemented, and their potential benefits have not yet been realized. At most operations within RWMC, line management has been able to work within the changing organization and assure adequate protection to worker safety and health, the public, and the environment. Further, ID oversight of contractor activities has been strengthened through the assignment of facility managers at RWMC in 1993. The facility manager is supported by a team that includes a facility engineer, facility representatives, project managers, and specialized technical support as needed. However, a number of organizational issues were identified that have had a discernible impact on performance.

The most significant issues involve crafts personnel coordinated and directed by the construction subcontractor to LMIT in the TSA-RE area. At TSA-RE, organizational issues, such as a structure that obscures subcontractor management's accountability for safety, have resulted in a situation where the LMIT subcontractors do not consistently meet the same standards of performance as LMIT employees or LMIT's other subcontractors. The TSA-RE construction subcontractor is required by their contract with LMIT to comply with all OSHA requirements and DOE orders. The construction subcontractor obtains most of its labor force (consisting of ironworkers, electricians, pipefitters, and other crafts persons) through a series of subcontracts. The construction subcontractor does not supply skilled labor for construction activities, but provides, directs, and coordinates the subcontractors using a general superintendent and safety engineer reporting to a project manager. Performance problems (e.g., a higher rate of injuries) have been evident at TSA-RE. The subcontracting arrangements for the TSA-RE construction subcontractor do not provide assurance that its subcontractors comply with all OSHA requirements and DOE orders. Further, with the current arrangement, injuries incurred by the lower tier subcontractors are not reflected in the construction subcontractor's injury rates and thus do not affect its performance evaluation. Therefore, the contractual controls on the TSA-RE construction

subcontractor's ES&H performance are degraded and difficult to enforce, and the organizational incentives are not conducive to effective ES&H performance.

In addition, there are indications that the TSA-RE construction subcontractor has a different approach to safety management than LMIT and other subcontractors at RWMC. The construction subcontractor field supervisors indicated that it is common knowledge that all work should be done in a safe manner but that some accidents and injuries are not avoidable. The LMIT requirement that the construction subcontractor adhere to a seven-point program designed to improve worker safety is viewed as intimidation by both the construction subcontractor's general superintendent and the safety engineer. Correspondence from LMIT to the construction subcontractor expresses concern that field supervisors appear to be unaware of or unwilling to enforce project safety requirements. In addition, the construction subcontractor does not always hold to the RWMC standards for training, and there is a lack of qualification requirements for subcontracted labor. Both LMIT and ID have recognized the issue and have taken action to address the situation within the current organizational and contractual framework. However, additional attention is needed to address the root causes. The contracting arrangements, training, qualifications, experience, and management philosophy issues discussed above may contribute to the substandard performance at TSA-RE operations. ID and LMIT have taken action to address contractual issues on future contracts; however, current contracts may need to be examined to assure that ES&H issues are adequately addressed.

In addition to concerns involving TSA-RE, the unique contractual arrangements and organizational issues involving Pit-9 present challenges to safety management. The organizational relationships between LMIT and LESAT are complex; in at least one case, LMIT has a subcontract (Work for Others) to provide some safety and health support services to LESAT. Such contractual arrangements are properly subjected to intense scrutiny; LMIT personnel have indicated that providing technical support in areas where the subcontractor lacks expertise could be construed as "favoritism" or create the appearance of a conflict of interest. ID has yet to fully implement the Organizational Conflict of Interest (OCI) Plan in naming a third independent member of the Review Board, or clearly defining how technical oversight support is sequestered. While avoiding the appearance of conflict of interest is important, there are indications that the focus on conflict of interest has sometimes been so narrow that safety issues have not received the appropriate priority. For example, corrective actions to address fire protection concerns required review, and contributed to delays in providing LESAT access to water supplies at RWMC. However, corrective actions were subject to scrutiny for an extended period while OCI issues were discussed and equipment secured. In the meantime, Pit-9 support activities were conducted without the concern being resolved. During the evaluation, this issue was resolved for the interim through a temporary hose connection to the RWMC water supply, but a permanent solution has yet to be implemented. A similar issue, involving waste generation and shipment (i.e., whether the waste generator number for INEL or a separate Pit-9 number will be used for shipment of hazardous waste generated during construction), also needs to be addressed. Resolution of these issues is time-critical because equipment maintenance and other shop functions will soon generate hazardous waste.

Planning and Implementation

The planning and implementation of the safety management program at RWMC are generally effective, but not all operations are achieving the same level of performance. LMIT uses effective procedures for hazards analysis and work planning. Participation by operations personnel and safety personnel enhance these procedures. For example, drum transfer operations from the Certified and Segregated Waste Storage Building to the WSF use detailed procedures (including checklists and independent verification at key steps in the process) and are performed in such a manner as to ensure that safety, environmental protection, and radiation control requirements are met. Further, RWMC uses all-hands meetings, bulletins, and daily briefings on "plan of the day" to inform its employees of new policies that impact their work. Although weaknesses were identified, operations conducted by LMIT personnel are generally well planned and conducted with the highest regard for safety. Similarly, construction activities at Pit-9 and WSF indicate a quality construction safety program that ensures that construction activities are conducted safely in accordance with applicable Federal and state

regulations and requirements, and DOE orders. However, as discussed earlier, the construction management safety systems at TSA-RE have not demonstrated the same level of performance, prompting corrective actions by LMIT and ID.

Although planning in the LMIT "Waste Management Work Package(s)" would have the safety and health technical staff spend about 75 percent of their time on the plant floor, they actually spend 80-85 percent of their time on paper exercises, particularly reviews. This paperwork burden significantly limits Safety and Industrial Hygiene's ability to provide quality technical support to in-plant RWMC operations.

Performance Evaluation

Effective evaluation of performance and prompt response to correct substandard performance are particularly important at RWMC/Pit-9 because of the multiple levels of contractual arrangements (i.e., ID contracts with LMIT, which contracts with various subcontractors, who in turn may use other subcontractors). It is clear that ID and LMIT are taking their performance evaluation responsibilities seriously and are devoting resources to monitoring and evaluating performance. Many aspects of the performance evaluation processes are effective (e.g., DOE's monthly evaluations of LMIT), and others are evolving (e.g., the facility representative program). The generally good safety record at RWMC and Pit-9 is an indicator that the overall system is working.

ID and LMIT controls, including requiring specific changes to the subcontractor Safety Program, that were put in place when degraded performance was noted at TSA-RE indicate that ID and LMIT are committed to taking action to correct substandard performance. However, several of the performance evaluation processes lack structure and a systematic approach. For example, the facility representatives do not have a plan or system for prioritizing their activities, and the performance in some areas is not tracked or monitored. These programs could benefit from better planning and systematic identification of performance evaluation goals and methods for achieving those goals. INEL has recently chartered a process improvement team that could serve as a vehicle for identifying ways to improve internal oversight processes.

AUXILIARY REACTOR AREA (ARA)

SUMMARY

The safety management program at ARA for decontamination and decommissioning (D&D) is very effective. ID and LMIT D&D project managers recognize that crews performing dismantlement are doing some of the most hazardous work at INEL and have appropriately focused their attention on assuring that those activities are conducted safely. The safety records are exemplary, indicating that their focus on safety has had positive results. Effective work planning, with employee involvement, has contributed to the successful record. In addition, the personnel performing D&D activities are experienced and knowledgeable of their work environment and safety responsibilities, and requirements have been identified and translated into effective operational processes, which are continually reviewed by both operations and safety personnel to identify enhancements to safety. ID personnel are committed to the safety programs, demonstrating their commitment by actions such as frequent walkthroughs.

BACKGROUND

ARA consists of four nuclear facilities, ARA-I, ARA-II, ARA-III, and ARA-IV. These reactors and their associated facilities were constructed in 1957 as part of the Army Reactor Program, which was phased out in 1965. All reactors have since been removed (deactivated). ARA-II originally housed the Stationary Low Power Reactor-1 (SL-1), which was accidentally destroyed in 1961. Reactor components were buried adjacent to the building. The facilities were used for site support services for several years and are now entering a D&D phase. D&D projects are ongoing at ARA-II and ARA-III. The buried reactor components are not included in the ongoing D&D projects that were the subject of this inspection. The D&D activities are typically small in scale, ranging from 2000 to 8000 square feet. The D&D program does not perform deactivation of major facilities such as ICPP, ROVER, and the Waste Calcining facility.

The most significant project hazards are associated with the construction, razing, and disassembly activities conducted as part of the D&D effort. Radioactively contaminated materials could potentially leak to the environment if not adequately controlled. However, except for the buried SL-1 reactor components, radioactive materials have been removed from the facilities and the only radiation hazards are associated with equipment that may be contaminated. The radiation hazards are relatively low, when compared to facilities that have significant amounts of radioactive materials in storage or process equipment. Similarly, the D&D activities generate some low-level waste and small amounts of Toxic Substances Control Act (such as asbestos and small amounts of polychlorinated biphenyls) and Resource Conservation and Recovery Act (RCRA) waste that must be handled safely, but the waste management hazards are relatively low compared to other facilities at INEL.

The topics reviewed were: radiation protection, waste management, industrial safety, industrial hygiene, and construction safety. An area of focus unique to ARA was the D&D activities. ARA is one of the few areas at INEL that has entered the D&D stage. Therefore, the review focused on the ongoing dismantlement projects at ARA-II and ARA-III.

STRENGTHS

■ **The safety record for ARA D&D programs is exemplary.** At ARA III, only two first-aid incidents were recorded in 50,000 person-hours of work, of which 10,000 involved asbestos removal and 5,000 involved confined space entry. The commendable safety record is reflected in the case rate statistics, which indicate that the number and severity of injuries and illnesses associated with the D&D program are significantly lower than those for INEL, DOE, or the nation as a whole.

■ **Employee involvement and management commitment have combined to create a positive "safety culture."** The important elements of a construction safety management program (e.g., work planning, health and safety plan implementation, comprehensive and current procedures, stop work authority, experienced and trained employees) are in place and functioning at ARA D&D projects. More importantly, both management and unionized workers have embraced safety as their first priority. The camaraderie and morale of the workers were evident throughout the review, and workers were committed to looking out for each other's welfare and safety at the job site. ID and LMIT management commitment to implementing their safety responsibilities is demonstrated by their actions, such as establishing a visible presence, conducting frequent walkthroughs, supporting the dedicated crew concept, establishing a formal self-assessment program, and generally promoting an atmosphere conducive to safety.

■ **The program has implemented an effective tool in the "Decontamination and Dismantlement Program Project Manager's Handbook."** This handbook establishes a living document of requirements, references, checklists, and lessons learned for each phase of a D&D project. The handbook was created to increase program efficiency by documenting beneficial practices and previous mistakes, providing quick access to references, and providing details on D&D activities. All decommissioning projects, regardless of size or complexity, could benefit by having a similar handbook to ensure that a formal management system is in place and meets requirements, implementing instructions, and guidance.

■ **The dedicated crew concept has enhanced safety.** One of the factors contributing to the enhanced safety program is the commitment to use dedicated crews. ID and LMIT managers at ARA recognize that team work is essential for safe work performance at D&D projects and that dedicated crews have better safety records. They have minimized changes of laborers within each crew and moved entire crews from job site to job site, rather than moving individuals from different crews and organizations to complete the work. ID and LMIT indicate that members of a dedicated crew are more apt to understand the D&D hazards, procedures, and work practices. Further, ID and LMIT indicate that the dedicated crew concept saves downtime during D&D work, allows cross training in most work areas, and provides an environment where each crew member cares about the safety of other crew members. This is an enhancement to the "buddy system" required by 29 CFR 1910.120 and is a successful management approach to ensuring construction safety.

WEAKNESSES

No significant weaknesses were identified that were specific to ARA II and III project implementation.

ASSESSMENT OF MANAGEMENT ELEMENTS

Policy

ID and LMIT have implemented effective safety policy and goals at ARA that reflect Departmental and industry policies and standards. ID and LMIT D&D project managers recognize that D&D crews are doing some of the most hazardous work at INEL. Accordingly, they have established that the ARA policy is "Safety is Job #1" and have clearly communicated that policy throughout the workforce. Workers recognize that everyone has stop work authority, with no fear of retribution for work stoppage. D&D managers and crew interviewed during the inspection recognized that safety is the top priority for all D&D activities at ARA II and ARA III. Requirements have been established that are commensurate with work site hazards. ID line management is ensuring and verifying contractor compliance through their actions. The ID project manager ensures that D&D crews have dedicated equipment, has established a visible presence, conducts frequent walkthroughs, supports the dedicated crew concept, and generally promotes an atmosphere conducive to safety. LMIT union employees working at ARA II and III verified that the ID D&D project manager is visible at the job sites, is concerned with the welfare of the workers, can be relied upon to obtain resources and equipment, and can be approached at any time with suggestions for improving the D&D process. LMIT ARA project managers have also supported the safety culture; their establishment of a formal self-assessment program at the local level, even though they were not required to do so by LMIT, is one example of their commitment to an effective safety program.

In some cases, there is a lack of processes to ensure the effectiveness of training programs and a lack of formal mechanisms for assuring accountability through performance evaluations. However, the effectiveness of local management plans and the demonstrated commitment to safety by management and the workers compensate for sitewide weaknesses. Personnel at the facility demonstrated an understanding of the safety aspects of their jobs and demonstrated competence through participation in a variety of activities, such as dry runs of new procedures. Personnel performing D&D activities are adequately trained to perform the work they are assigned, demonstrate awareness of the hazards associated with their work, and are cognizant of the measures needed to protect against those hazards.

Organization

Line management for D&D projects at ARA has been able to work within the changing INEL organization while continuing to assure adequate protection to worker safety and health, the public, and the environment. LMIT D&D responsibilities were formally transferred to a sitewide consolidated organization. The D&D program at INEL, using a LMIT program manager, in conjunction with the LMIT project manager, provides direction to D&D project activities. Project managers deploy dedicated crews and oversee day-to-day work activities at the job site. ES&H oversight of worker activities is reviewed by a staff engineer from the LMIT health and safety organization. At the local ARA project level, this organizational structure, most notably the use of dedicated crews for implementing the program, has fostered a thorough understanding of each individual's responsibilities and reporting relationships, effective communications, and clear lines of authority. A notable aspect of the organization at ARA is the experience level of the managers. For example, the program manager has 20 years of extensive safety training. The management team has the tools and skills to effectively address safety issues during the planning phase of D&D projects, to understand crews' safety concerns, and to recognize job site hazards during walkdowns.

Although no serious problems were noted, it may be prudent to focus additional attention on training in waste management requirements and technical support to ARA personnel on environmental issues. Examples of issues related to training include:

- The LMIT quality assurance office inspector assigned to review waste operations at ARA II does not have the radiological control training required for access to the radiological contaminated areas at the facility.

- The Radiological Control Technician responsible for documenting radiation surveys of waste shipments was not provided training on recent changes to the documentation requirements for waste packaging and transportation.

- No formal training on the waste acceptance criteria is provided to waste generators at INEL, and no site or project specific training on waste acceptance criteria is provided to D&D employees. Instead, the D&D program uses a few personnel (field supervisor and collateral duty environmental engineer) to provide packaging and waste acceptance support as needed, and relies on support from RWMC for loading low-level waste boxes. However, this support has been inconsistent.

In addition, the ARA III field project personnel do not have environmental experience or background. Environmental support within the D&D program is provided by an environmental engineer when requested by a D&D field project supervisor. The D&D environmental engineer uses LMIT matrix support as needed. However, D&D personnel report that they have had problems obtaining needed support in the past. A more detailed waste management project plan within the scope of the project decommissioning plan could address this situation.

Planning and Implementation

The planning and implementation of the safety management program at ARA are effective, particularly for the high-hazard activities associated with D&D. LMIT uses effective job hazards analysis and work planning, which is enhanced by the participation of operations personnel and safety personnel. D&D activities are generally well planned and conducted with the highest regard for safety. Since 1977, 25 D&D projects have been completed. The total recordable case rate (which reflects the total number of instances of injuries and illnesses), the lost/restricted work day case rate (which reflects the number of instances that result in lost or restricted work days), and the lost/ restricted work day rate (which reflects the number of lost or restricted days resulting from injury or illness) are shown in Table A-3 for the D&D projects for the past three years. For comparison, the corresponding INEL-wide and DOE-wide data are shown. The latest available industry-wide and construction-specific case rate data kept by the Bureau of Labor Statistics are also shown for comparison.

Table A-3. Case Rate Data

CASE RATE DATA					
Indicator	**D&D (3 yr avg)**	**INEL-wide (3 yr avg)**	**DOE-wide (3 yr avg)**	**BLS-1993 (Ind.-wide)**	**BLS-1993 (Const. only)**
Total Recordable Case Rate	2.0	3.39	3.65	8.9	12.2
Lost/Restricted Work Day Case Rate	1.6	1.54	1.67	3.9	5.5
Lost/Restricted Work Day Rate	6.9	31.9	44.5	- *	- *

* The Bureau of Labor Statistics (BLS) no longer keeps these statistics.

These statistics indicate that the accident/injury rates at the D&D project are somewhat lower than both INEL-wide and DOE-wide rates, and significantly lower than national rates for industry and construction. Also, the low lost/restricted work day rate (which reflects the number of days lost rather than the number of incidents and thus provides a better indication of the severity of injuries and illness) for D&D suggests that the injuries and illnesses experienced in the D&D program are less severe than those experienced throughout INEL or DOE.

A key document used for planning program activities is the "Decontamination and Dismantlement Program Project Manager's Handbook." This handbook provides lessons learned, regulations and references, and details on D&D activities. As a frequently updated document, the handbook captures lessons learned from both positive and negative experiences, in order to ensure that beneficial practices and previous mistakes are documented. The handbook reduces research time by providing a continuously updated listing of references and sources of information. Finally, the handbook provides standard operating procedures (including checklists at key steps in the process), which are used to ensure that safety, environmental protection, and radiation control requirements are met.

The primary focus of D&D management at ARA II and III has been on the safe conduct of D&D activities, which are viewed as the highest hazards at the facility. Correspondingly, most of the attention has been directed toward programs directly related to the safety of the work crews, such as industrial safety and construction safety. Other programs, such as radiation protection and waste management, have received a lower level of attention, consistent with the lower level of hazard. In general, the focus on the high hazard activities is appropriate, and other programs are implemented in a manner consistent with the hazards. However, some waste management and worker safety problems have been noted. For example, a low-level waste box at ARA III will require repacking to meet void space requirements of RWMC's waste acceptance criteria, and 45 shipments of low-level waste to RWMC occurred after the expiration of the D&D waste certification program. These problems may be related to the inconsistent training and support in environmental and waste management discussed earlier. The field manager at ARA II is trained in waste packaging and shipping, and did not experience problems with low-level waste shipments. Further, improved housekeeping controls are needed at ARA III to further reduce worker exposure hazards associated with cluttered work spaces and walking surfaces, sharp objects, sizing of salvage material, falling objects, and electrical cords.

ID and LMIT managers indicated that budget reductions and prioritization impacts under consideration at INEL may result in postponing or eliminating the scheduled D&D of surplus facilities. INEL has analyzed the budget implications of

delaying D&D activities. The analysis recognizes that delays increase the D&D portion of the life cycle cost, because of contamination spread, facility degradation, and decreased structural integrity that causes safety concerns. However, the surplus facility life cycle cost analysis does not include a weighting factor for safety and health risks, and therefore may not provide a full picture of the economic and safety implications of various options.

Performance Evaluation

ID and LMIT are taking their performance evaluation responsibilities seriously and implementing them effectively. Although safety statistics must be interpreted with caution and with a full understanding of the validity of the data, the safety record at ARA is one indicator of the effectiveness of the attention to safety. DOE management has established a presence at D&D sites by walking each D&D project weekly and at critical times during D&D activities to ensure that work is being conducted safely. A notable facility-specific initiative is the self-assessment program, which was implemented even though LMIT eliminated the requirement for self-assessment. ARA III personnel have performed self-assessments of construction safety vulnerabilities that apply to D&D operations at ARA III. OSHA and DOE consensus requirements documents are used as protocols for these assessments. Results are documented and used to modify D&D construction activities so that safety is enhanced for both ongoing and planned work.

TEST REACTOR/ADVANCED TEST REACTOR

SUMMARY

Line management has defined and is implementing a comprehensive safety management system at the Test Reactor Area (TRA). In general, the overall safety management program incorporates the performance objectives and criteria indicative of an effective program. With only minor exceptions, TRA line managers are responsible and accountable for ensuring that facility operations and work practices are performed in a manner that provides adequate protection to worker safety and health, the public, and the environment. Decision makers at the facility level understand and implement ES&H program goals. Most requirements applicable to TRA facilities are commensurate with hazards located at the facility, and the hazards are being continually analyzed. Responsibilities and accountabilities are clearly defined and ensure that applicable requirements are effectively identified, transmitted, and implemented.

Most TRA workers and managers are technically competent to perform their jobs and are appropriately educated and knowledgeable of the hazards associated with site operations. Line managers encourage active participation by workers in maintaining and improving protection to worker safety and health, the public, and the environment. Line managers have established and implemented processes to ensure the effectiveness of training programs in improving and measuring performance and identifying additional training needs, and to ensure continued competence commensurate with responsibilities. One notable exception is the level and types of environmental training provided to ID facility representatives matrixed to TRA.

Specific weaknesses were identified in the design and operation of selected safety systems of the Advanced Test Reactor (ATR). Of particular concern are the failures in the performance feedback systems, such as quality assurance, self-assessment, and independent engineering review, within both the contractor and ID organization to ensure that identified safety deficiencies at ATR are effectively resolved and related system modifications are completed on a timely basis.

BACKGROUND

The TRA is located in the southwestern region of the INEL site approximately 47 miles west of Idaho Falls, Idaho, and 16 miles east of Arco, Idaho.

The ATR began operation in 1967 and is dedicated to the study of radiation effects on materials and fuels. Materials and fuels are placed in test locations within and around the extremely high neutron flux generating core of the ATR to test their response to reactor environments. The ATR also produces radioisotopes for medical and industrial applications. The current safety analysis is contained in a design basis report for the facility. A major update to the design basis report was incorporated in 1976 to support a substantial upgrade to the plant protection system. Other

revisions have been made to the design basis report over the years to define the "envelope" for the operation of the facility.

In addition to the programmatic and organizational transitions resulting from the recent integration of the new site contractor, a major transition is also under way in the authorization basis of the ATR. Major changes to the original design basis report have been re-analyzed over the past several years, and the resulting changes are incorporated in a draft Updated Final Safety Analysis Report (UFSAR) and a Technical Specification Requirements document recently submitted to DOE for approval in accordance with DOE Orders 5480.22 and 5480.23. Additionally, a detailed (Level 1, 2 and 3) probabilistic risk assessment (PRA), as well as many other design and engineering calculations, have been performed to support these two DOE submittals. These analyses effectively establish a new design basis for the facility and establish a new authorization basis for the operation of the ATR.

At the time of the inspection, the contractor had recently completed a planned outage at ATR ahead of schedule. The ATR was operating at power under its current authorization basis as specified in the design basis report, with the exception of modifications to facility operating limits necessitated by several significant differences identified between the current design basis report and the new (draft) UFSAR submittal.

The principal hazards at TRA are associated with current and past operation of nuclear reactors. These hazards include low-level radioactive and hazardous industrial wastes. Irradiated nuclear fuels temporarily stored in several shutdown reactor facilities and residual radiation from activated/contaminated components at such facilities constitute a substantial radiological hazard. The ATR, as an operational nuclear facility, has a substantial post-accident nuclear source term. Additional radiological hazards result from the ATR's irradiation component and material testing and radioisotope production mission.

The team evaluated the effectiveness of the safety management system in place at the TRA by reviewing selected safety infrastructure, processes, systems, and activities. Areas evaluated include waste management, worker safety, radiation protection, and authorization basis. Vertical reviews were conducted of a representative sample of essential systems supporting the safe operation of the ATR to confirm whether the programmatic aspects of the safety management process are functioning to protect workers, the public, and the environment. Essential systems reviewed include standby and emergency electrical, emergency core cooling, emergency firewater injection, and heating, ventilation and air conditioning.

STRENGTHS

■ **Implementation of conduct of operations requirements specified in DOE Order 5480.19 at ATR is exemplary.** The ATR is operated in accordance with DOE Order 5480.19. Maintenance and operations personnel at the ATR are competent and well qualified. The work planning process at ATR successfully integrates plant engineering, lead work group, and radiological control organization inputs into the planning effort. The facility material condition is excellent, and operational performance has been exceptional.

■ **TRA personnel radiation exposure dose tracking is excellent.** TRA has effectively integrated real-time dose tracking into their work control processes through the use of the "Fast Track" electronic dosimetry measurement system. Work package radiation exposure records show that the use of the "Fast Track" system is an innovation that has resulted in reduced personnel radiation exposure on many jobs and at the site in general.

■ **TRA has achieved significant reductions in the amount of waste generated**. The amount of waste generated has been significantly reduced since 1993, particularly hazardous waste. Requiring current waste minimization and/or pollution prevention program plans as a prerequisite for waste disposal is an effective means of ensuring the preparation of these documents.

■ **Effective outage management at ATR has resulted in reduced outage time and has contributed to improved operational efficiency.** ATR management has implemented a strong outage management program that has turned around past poor performance. Outage downtime has improved significantly.

WEAKNESSES

■ **The current configuration of the ATR backup dampers and their air supply system was found not to be supported by design basis and operational documents.** Post-modification testing following the installation of confinement ventilation system backup dampers in 1990 revealed that closure of dampers increased containment leakage in some cases. As a result, the dampers were disabled in the open position by continuously supplying instrument air to the air-operated actuators of each damper. Current surveillance procedures, as well as the emergency operation procedures, require actions regarding the operation and/or testing of these dampers even though the dampers are not operational. Additionally, the backup damper instrument air supply currently provides a safety function (holding the dampers in the open, or inactive, position), but it is not treated as a safety-related subsystem. ID subsequently determined that a facility operability issue did not exist with the current configuration and under the current authorization basis. Surveillance and operations procedures were revised to reflect the current configuration of the system. *(Issue Form Number INEL-FSMB-95-02)*

■ **Modifications required to support the design basis seismic qualification of the ATR fire water injection system piping have not been completed**. Significant upgrades to ensure the seismic integrity of the fire water injection system during the design basis earthquake were identified as necessary in 1991 but had not been installed at the time of the inspection. Subsequent to the identification of this issue, the site declared the system inoperable and entered the applicable Technical Specification action statement. Authorization to extend the time allowed by the action statement was obtained from the Office of Nuclear Energy to continue operations for 72 hours until modification of the system could be completed. A modification to ensure operability of the fire water injection system was subsequently completed on an expedited schedule. Other modifications are required to bring the system into full code compliance. *(Issue Form Number INEL-FSMB-95-03)*

■ **Performance feedback systems of both the contractor and ID failed to determine that modifications to upgrade safety systems at ATR were not completed in a timely manner.** Modifications to add confinement backup dampers and upgrade the fire water injection system seismic response were not implemented in accordance with standing commitments made in the early 1990s. Performance feedback systems of both the contractor and ID failed to ensure that the significant safety deficiencies that initiated these modifications were effectively resolved and promptly corrected. Justifications for continued operations over this extended period were not formally documented. LMIT instituted immediate corrective actions to address the specific issues and plans to evaluate other essential systems at ATR to determine compliance with previous commitments. *(Issue Form Number INEL-FSMB-95-02 and 03)*

■ **Current emergency operating procedures provide directions contrary to the ATR's draft UFSAR.** The new accident analysis indicates that emergency cooling flow is required for a minimum of 30 minutes following a reactor scram from rated power to prevent core damage. However, emergency operating procedures direct the operators to secure normal and emergency cooling pumps in response to a loss of coolant accident, which typically occurs prior to the 30 minutes specified in the design basis. Affected procedures were subsequently revised to meet the new design basis assumptions.

■ **The (draft) UFSAR design basis loss of coolant accident break size is not clearly supported by existing analyses and may be less conservative than the previous authorization basis break size of 8 inches.** Several inconsistencies and nonconservatisms were identified in analyses supporting the reduction in the design basis loss of coolant (LOCA) accident break size from 8 inches to 3 inches in the draft UFSAR. The specific items identified during the Office of Environment, Safety and Health (EH) review of the PRA and draft UFSAR have been transmitted to the Office of Nuclear Energy (NE) Safety Analysis Report (SAR) review group for further evaluation and consideration. *(Issue Form Number INEL-FSMB-95-09)*

■ **Some radiological protection requirements are being inconsistently or incompletely implemented.** Inconsistencies were noted in radiological work control, radiological control technician continuing training, high radiation area control, radiological surveys, contamination control, waste analyses, certification and training, and self-assessment. For the most part, deficiencies noted were minor, did not represent a systemic breakdown in worker protection, and did not reflect significantly

on an otherwise strong radiation protection program. *(Issue Form Number INEL-FSMB-95-06)*

ASSESSMENT OF MANAGEMENT ELEMENTS

Policy

For the most part, TRA line management implements effective safety policies and goals that reflect Departmental policies and industry standards and assure a safety culture that permeates every level of the organization. For example, an acceptable radiation protection policy is in place and understood by the TRA work force. Like most policies reviewed during this evaluation, it is comprehensive and achievable, providing a sound basis for both radiation protection program implementation and communication of its requirements.

Generally, the development and implementation of safety policies are supported by senior line management. Safety policies, goals, and expectations are clearly being communicated to all requisite personnel.

Policies are established to ensure that DOE and contractor workers possess technical competence, commitment, discipline, and high standards of professional excellence. Minor exceptions were noted in such areas as radiological control technician training and radiological work permit preparation and review.

Although not always appropriately implemented, requirements are established commensurate with the hazards present throughout the life cycle of the facility. A minor exception was noted in the excess material program, which resulted in TRA disposing of scrap metal into the INEL landfill that could have been recycled as excess material.

The applicability of ES&H requirements is primarily based on regulations, work place hazards, and hazards analyses that support facility authorization bases. Specifically, the development of an advanced PRA for the ATR is a notable endeavor to further quantify the risks associated with facility operation. Both a UFSAR and Technical Specification Requirements documents have been submitted to DOE for review and approval in accordance with the requirements of DOE Orders 5480.23 and 5480.22. While not required, a detailed failure modes and effects analysis is not included in the new UFSAR. Such analyses will assure that all equipment and component failures are systematically evaluated for impact on plant operation and that required contingencies are developed.

Most of the required analyses were documented, retrievable, and repeatable. However, this evaluation identified two areas in which the documentation of analyses did not clearly support the draft upgraded authorization basis. Vertical reviews conducted on essential systems at the ATR revealed potential inconsistencies in the new authorization basis as specified in the current revision of the draft USFAR originally submitted to DOE in October 1994. The two areas were the analyses supporting the frequency of occurrences and the magnitude of the design basis loss of coolant accident and the analysis supporting the complete loss of flow accident.

These analyses included applications of PRA-based assessments of probabilities of occurrence in support of the UFSAR design basis accident frequencies rather than more standard deterministic approaches. The current supporting documentation does not clearly defend these applications of the PRA-based assessments.

These analyses have been translated into data used to support major changes in the loss-of-coolant design basis accident and conclusions regarding core melt frequencies at the ATR. ID management believes the PRA is consistent, and conservative, and that a break of greater than 3 inches in primary coolant system piping and subsequent core damage is not credible at ATR. Over the first 20 years of operation, it has been assumed that the maximum LOCA break size would be 8 inches and would result in core damage.

Elements of the issue of single-failure loss of emergency cooling water were previously identified by the NE SAR review team. ID has transmitted the details of both EH issues to the NE SAR team for further review and evaluation.

Organization

Within TRA, organizational responsibilities and accountabilities for ES&H are, with few exceptions, defined to ensure that facility operations and work

practices are performed in a manner that provides adequate protection to worker safety and health, the public, and the environment. Generally, organizational requirements are identified, transmitted, and implemented in a manner that will provide adequate protection of worker safety and health, the public, and the environment. ATR operations, TRA maintenance, and TRA radiation protection are notable examples of well defined organizations within TRA with clear roles, responsibilities, and accountabilities. Managers maintain the authority to make and implement decisions regarding ES&H. Each individual at ATR has the authority to stop work when unsafe acts or situations occur.

Accountability for ES&H responsibilities and performance is not as well established in the environmental support organization. For example, roles, responsibilities, and accountabilities are not specific. Each staff member has an identical position description within a given job category. Similarly, the roles, responsibilities, and accountabilities of the ID environmental facility engineer at TRA are not well defined. His current job description does not specifically correlate with his actual duties on site.

Most TRA organizations are staffed at appropriate levels with competent individuals. The competence and qualifications of the personnel staffing both the ATR operations and maintenance organizations appear to be excellent. However, some understaffed organizations were identified within the TRA. For example, of the 18 personnel matrixed from the Environmental Support organization to ICPP/TRA, only one is stationed at TRA. While several other LMIT personnel provide regular support to TRA, access to and communications with other environmental professionals are hindered.

The levels of experience, education, knowledge, skills, and training necessary for most management and technical positions at TRA are clearly identified, and management maintains and active role in ensuring that personnel perform up to expectations. Of notable mention is the active role that senior facility managers at ATR take in observing, assessing, and training plant operations staff, particularly during the simulated performance exercises and drills.

Planning and Implementation

Line management at TRA understands and synthesizes program goals and ES&H risks in order to effectively deploy resources to ensure that hazards are analyzed and understood; appropriate hazard mitigation actions are identified and in place; and activities, hazard reduction, and issue resolution are effectively prioritized, scheduled, and completed. A formal ES&H planning and budgeting process is in place that prioritizes ES&H activities, facilitates implementation of established policy, and addresses identified risks.

With the minor exception of a lack of formalized environmental reviews of work packages, work activities and operations are properly planned and implemented, including consideration of risks and hazards and integration of support services. Other site support activities and operations are also effectively controlled to ensure safety through supervision, procedures, training, and the implementation of approved policies, programs, and requirements. An indicator of the contractor's performance in this area is that no overdue safety-related preventive maintenance activities were identified at ATR.

However, a potential for contaminated material to be released from the site exists due to a change in the procedure for surveying materials for unrestricted release from INEL; three drums of radioactive material stored outside of a required designated radioactive material storage area at the TRA hotcell building since March and an outdoor high radiation area for storage of radioactive material did not contain one of the physical access control features discussed in Appendix 3B of the DOE Radiological Control Manual.

Most significant hazards appear to be analyzed and assessed in order to identify the relative significance and application of Departmental requirements. Generally, line management maintains continual compliance with applicable Federal and state statutes, Departmental policy and requirements, and applicable industry standards. A notable example of this is the exemplary implementation of the requirements of DOE Order 5480.19, Conduct of Operations, at the ATR.

Two issues were identified in the conduct of site activities that have the potential for adversely impacting the margin of safety assumed in the draft UFSAR. Examples include the inoperability of confinement backup dampers (installed under a

modification in 1990) and the current configuration of their air supply system; current emergency operating procedures providing directions contrary to the new ATR accident analysis; and failure to complete modifications required to support the design basis seismic qualification of fire water injection system piping. Weaknesses in engineering support and modification controls, issue management, and oversight contributed to the failure to resolve these issues in a timely manner.

TRA line management ensures that workers and managers are technically competent to perform their jobs and assignments and are appropriately educated and knowledgeable of the hazards associated with site operations. Many aspects of the training and qualification program are formal and structured; job performance requirements are identified, documented, and reflected in training content, as well as in individual examinations and evaluations. For example, the ATR simulator is effectively utilized to enhance operator training and evaluation. Drills observed by the evaluation team were well organized and effectively administered by the training staff. Notable exceptions include the lack of formal processes and training to ensure that waste generators are appropriately trained, and the depth of training on consolidated management control procedures for implementing the radiological requirements contained in the INEL Radiological Control Manual and 10 CFR 835.

Performance Evaluation

Key performance measures are routinely monitored and evaluated by management. Key performance indicators are established in such areas as maintenance backlog, personnel exposures, and lost time injuries and accidents. For example, specific performance feedback and measures are established for ATR outages and are thoroughly documented and evaluated to ensure adequate performance during the outage. Tracking and trending of these performance indicators contributed to the successful completion of the most recent outage ahead of schedule.

The management team for ATR is currently implementing a program of performance incentives that are tied directly to the facility performance indicators. This program is based on the set-aside of a portion of the INEL award fee that will be paid based directly on the management controls and ability to meet performance indicators. Some of the key indicators include ATR operating efficiency; ATR personnel radiation exposure; safety cost index; failure to comply with technical specification limiting conditions for operation; unplanned ATR shutdowns; cost of agreed upon FY95 work scope as it pertains to ATR/TRA; and the development of non-prime sponsor (Office of Naval Reactors) reactor usage time. The current trend at TRA in general is positive in that the goals associated with the performance indicators are being met or exceeded, except for unplanned shutdowns and non-prime sponsored business development. One other key indicator that has been established relates to downtime associated with ATR outages. Based upon the information to date, ATR management has implemented a strong outage management program that has turned around past poor performance.

The length of time that two safety system deficiencies and modifications remained unresolved and uncorrected indicates a programmatic weakness in tracking, prioritizing, and resolving past safety issues; management commitments; and corrective actions essential to continual compliance with current requirements. Between 1988 and 1990, TRA management committed to the installation of backup confinement isolation dampers in the TRA ventilation systems in response to a DOE technical safety appraisal and DOE's evaluation of the Three Mile Island accident review findings and concerns. The backup dampers were installed in 1990, but were never made operational. The action items associated with these commitments were subsequently closed and accepted by ID without the backup dampers ever being operational. No formal documentation exists to justify operation with the backup dampers inoperable, and there is no indication that ID was informed of this condition. The contractor initiated an unreviewed safety question determination regarding the backup dampers and determined that no operability issue existed. The backup dampers are considered a safety enhancement and are not required by the current design basis.

Similarly, only limited attention and resources have been applied to resolving seismic concerns about the fire water injection system at ATR. This issue was identified in 1991 and was not adequately resolved at the time of this evaluation. A contractor evaluation performed during the inspection resulted in the initiation of a modification on an expedited schedule to preclude facility shutdown.

Auditing and self-assessment of safety-related matters and activities and monitoring of the effectiveness of safety management programs and processes through the self-assessment program are not occurring on a regular basis. For example, formal DOE and contractor programs to conduct assessments of the INEL radiological control program are not fully developed and implemented, and few assessments have actually been conducted.

For the most part, line managers have established and implemented processes to ensure the effectiveness of training programs. Training programs were found to include feedback to ensure effectiveness, with the exception of radiological control core training conducted by Eastern Idaho State Technical College. DOE has not documented any assessment of the actual training being provided.

IDAHO CHEMICAL PROCESSING PLANT (ICPP)

SUMMARY

Line management at ICPP understands and accepts responsibility for safety. However, visible commitment to safety (e.g., through attendance at safety meetings and periodic walkthroughs of work areas) was not apparent to workers. Responsibilities for identifying, transmitting, and implementing requirements are clearly defined and were understood. Most requirements have been developed and implemented in the functional areas reviewed. However, some requirements in radiation protection and waste management had not yet been identified or implemented.

Safety policy goals and objectives have been developed and communicated by line management. Some LMIT managers are not held accountable for ES&H performance through specific ES&H goals and objectives in personnel performance appraisals. Employees are aware of their responsibilities for safety, and observations revealed they applied safe work practices. There was some concern, based on issues identified at TRA and the recently discovered shielding and seismic deficiencies in the empty fuel cutting pool at CPP-666, that quality assurance, self-assessment, and independent engineering review of important safety design features have not been sufficient in the past.

Interviews and observations revealed that staff performing operations at ICPP were competent to perform their duties. Training and qualifications of staff with ES&H responsibilities meet and sometimes exceed DOE requirements, except in the areas of criticality safety and project management, where there are no formal training programs. The ICPP training program is effectively integrating sitewide LMIT training programs with those established by the previous contractors, with the exception of required waste minimization training. Managers fully understand their responsibility to ensure that employees are properly trained, and there are effective systems in place to assist managers in tracking the training needs of their employees. There was some concern that the amount of funding dedicated to continuing personnel training, especially at ID, was not adequate to sustain a highly qualified and trained ES&H workforce.

BACKGROUND

The ICPP is located 45 miles west of Idaho Falls, Idaho. It was constructed in the 1950s to reprocess spent fuel from government reactors. Today, all of the reprocessing operations are idle, and the ICPP stores irradiated fuel from government reactors and liquid radioactive wastes from fuel reprocessing activities and other nuclear operations.

ICPP houses a variety of facilities for radioactive waste storage and treatment, including the new waste calcining facility, where liquid radioactive waste is reduced by thermal treatment to solid waste, and the tank farm facility and associated evaporators, where liquid radioactive wastes are stored, blended, and/or volume-reduced. Also, ICPP is implementing a deactivation, decontamination, and decommissioning program that includes recovery of fissile material from the ROVER facility in Building CPP-640. A major effort to remove spent reactor fuel from CPP-603 to CPP-666 is under way in accordance with external commitments. The effort includes the installation of new high density storage racks.

The principal hazards at ICPP include storage of corrosive, highly radioactive waste in underground storage tanks; transfer of this waste to processing facilities; and operation and maintenance of processing facilities. Another potential hazard is storage of irradiated fuel, which presents concerns regarding radiation protection and criticality. Other hazards at ICPP include ongoing construction of

new facilities, particularly the tank farm upgrade project, New Waste Calcining Facility (NWCF) evaporation, and deactivation and decommissioning of facilities.

The organization of ICPP is in transition as a result of the consolidation of contractors. The former ICPP contractor, Westinghouse Idaho Nuclear Company, Inc., was a relatively insular organization, and a single site manager controlled operations; under LMIT, ICPP operations have been reorganized so that the General Manager for Nuclear Operations has responsibility for multiple sites (i.e., ICPP and TRA), and within ICPP there are separate directors for spent nuclear fuel programs and the high-level waste program. In addition, Westinghouse Idaho Nuclear Company, Inc., provided ES&H support through resident staff reporting through the line; LMIT now provides ES&H services through a matrix organization managed from a central location in Idaho Falls.

The following ES&H programs were reviewed at ICPP: essential system functionality at the new waste calcining facility, process safety, radiation protection, criticality safety, industrial safety, construction safety, and waste management. Specific facilities that were the focus of this inspection included the fuel storage building (CPP-603), the new waste calcining facility (CPP-659), the fluorinel dissolution and fuel storage facility (CPP-666), and the headend processing plant (CPP-640), which includes the ROVER deactivation project.

STRENGTHS

■ **LMIT has established an integrating SAR committee to risk prioritize safety documentation, train analysts, and matrix analyst skills to increase efficiency.** ICPP has a number of nuclear facilities subject to SAR requirements. The current inventory of SARs reflects various operational conditions and facility configurations; almost all need to be upgraded to comply with the new requirements embodied in DOE Order 5480.23. The SAR committee provides a focused group of trained personnel to objectively decide which SARs should be prioritized for upgrade, based in part on hazards analyses and on the accuracy of the existing SAR. The committee also allocates resources to revising SAR to ensure the most appropriate mix of skills.

■ **ICPP has achieved a significant reduction in the generation of hazardous and non-hazardous waste, and there is a comprehensive waste minimization planning process in place. The ICPP Waste Management Authority provides a technically qualified forum for resolving waste minimization and waste characterization issues.** The Waste Management Authority is composed of representatives of the major waste management facilities at ICPP and environmental professionals with experience in chemical engineering and regulatory requirements. They review individual requests for disposal and suggest alternative materials and treatment and disposal methods to ensure that technical waste acceptance criteria are met, improving regulatory compliance and waste minimization.

■ **The asbestos control program at ICPP ensures the minimum potential safety hazard to workers.** The asbestos control program features an effective policy to reduce the potential for exposure, trained personnel available to respond anytime to potential concerns, and effective controls over work on asbestos-related tasks. Visible insulation has been identified at ICPP, and there is a conservative policy which assumes that covered or unidentified insulation contains asbestos until confirmatory sampling and analysis can be performed by specially trained personnel. These personnel are also capable of performing work on asbestos materials using specialized personal protective equipment.

■ **Mockup training for recent work in the blend and hold cell at the new waste calcining facility resulted in significant reduction in the total radiation exposure.** Extensive mockup training was conducted for repairs/modification performed earlier this year on systems inside the blend and hold cell at the new waste calcining facility. The mockup training focused on installation of a special shielding package and the unique welding techniques that were required to perform the work. As a result of the mockup training, welder performance improved markedly and the shielding package was modified, significantly reducing the time required to install and remove the shielding. These actions directly resulted in about a factor of ten reduction in the total radiation exposure received during the work.

WEAKNESSES

■ **Weaknesses in planning and implementation of some radiation protection program requirements reduce overall program effectiveness.** Radioactive material was identified in storage outside of a required designated radioactive material storage area. A change in the procedure for surveying materials for radiological release that exempts materials located outside of a radiological buffer area has no documented technical basis. Trucks transporting contaminated soil from a storage area to the tank farm are not surveyed to determine the presence of radiation areas or high contamination areas. Daily air sampling at the tank farm valve box is not consistent with the Radiation Control Manual, which requires sampling whenever radioactivity levels can fluctuate. There were also deficiencies in continuing training for radiation control technicians and procedure changes. Failure to fully and consistently implement all program requirements could result in the loss of control of radioactive material, the spread of contamination outside of controlled areas, and excessive radiation exposure to personnel.

■ **The streaming radiation experienced on August 19, 1995, during fuel movement at CPP-666 basin may represent an unanalyzed safety envelope condition and increase the potential for personnel exposure.** At CPP-666, a radiation monitor near the empty fuel cutting pool alarmed when fuel was moved in the transfer canal near the canal gate. INEL properly initiated an investigation and deemed the issue an unreviewed safety question. Further review indicated that ICPP had not developed or implemented a requirement for lateral shielding of nuclear fuel, creating the potential for increased radiation exposure if personnel were to access the empty fuel cutting pool.

■ **ICPP has not implemented a comprehensive program to provide initial and continuing training to waste generators on waste characterization and waste minimization programs and initiatives. There is no formal program to hold line management accountable for waste minimization goals or proper waste characterization.** Waste minimization and waste generator training are required by INEL sitewide policy documents. Failure to train employees on waste minimization and pollution prevention programs increases the potential that these important programs will not be implemented by all employees. Failure to train employees on waste characterization requirements increases the potential that wastes will be improperly characterized, potentially resulting in improper treatment, storage, or disposal. Failure to hold line management accountable for waste minimization goals increases the potential that line management will not commit adequate resources to achieve waste minimization program objectives.

■ **Employees expressed concern about senior management's commitment to safety based on a lack of attendance at safety committee meetings and reduced presence "on the floor."** Interviews with employees revealed that ICPP senior managers do not conduct periodic tours of working areas or attend safety meetings. Employees' perceptions may also be attributable to such factors as the change in senior management at ICPP and the associated reorganization that resulted in more than one manager in charge of ICPP; and ineffective communication of initiatives, such as the work order reduction effort.

■ **There is no formal program to hold line management accountable for waste minimization goals or proper waste characterization.** ICPP has not implemented a comprehensive program to ensure generators fully characterize waste in a timely manner. Full characterization of waste is necessary to ensure compliant storage and timely disposal of waste, and to meet waste minimization goals. Waste minimization and waste generator training are required by INEL sitewide policy documents. Failure to hold line management accountable for waste minimization goals increases the potential that line management will not commit adequate resources to achieve waste minimization program objectives.

■ **ICPP has not identified the requirement or implemented a program to inspect loading and unloading areas of treatment, storage, and disposal units daily when they are in use.** ICPP has a number of waste management units regulated by RCRA. The requirement to inspect loading and unloading areas was not included in ICPP inspection procedures or forms. The RCRA regulations are specific in requiring documented inspection of areas subject to spills, including loading and unloading areas. Failure to perform these inspections exposes INEL to possible enforcement actions. INEL has indicated that it will evaluate options to implement this requirement, including modifications of procedures, inspection checklists/schedules, or training

lesson plans, and will determine whether corrective actions are required sitewide.

ASSESSMENT OF MANAGEMENT ELEMENTS

Policy

There is abundant evidence that management has established and communicated safety policy throughout the line organization. The radiation protection policy is understood by ICPP employees. There is a comprehensive asbestos policy that incorporates work controls, and personnel are trained and qualified to ensure that asbestos hazards are properly mitigated. Sitewide policies for waste minimization, waste characterization, and chemical control have been established and implemented at ICPP. Goals and objectives for the startup of the high level waste evaporator and the new waste calcining facility have been established and communicated.

Although safety policy has been established and communicated, employees expressed concern about LMIT senior management's commitment to safety. Interviews with employees revealed that ICPP senior managers do not regularly conduct tours of working areas or attend safety meetings. Employees' perceptions may also be attributable to such factors as the change in senior management at ICPP and the associated reorganization that resulted in more than one manager in charge of ICPP; and ineffective communication of initiatives, such as the work order reduction effort.

There were several instances where facility policies were either absent or not consistent with sitewide policies established as part of the consolidation of contractors. The ICPP policy for review and approval of radiological work permits is contrary to LMIT policy and may not promote line management responsibility for radiation protection because the lead work group is not required to generate the radiological work permits. In the areas of criticality safety and project management, there are no policies to develop training or qualification programs to ensure competence.

Organization

LMIT has established a safety management organization at ICPP that, for the most part, clearly defines roles, responsibilities, and authorities that are understood throughout line management. The ICPP ES&H manager is provided with matrix support from the sitewide ES&H organization under the Office of the President and from the engineering organization under the Applied Engineering and Development Laboratory. These organizations can provide ES&H personnel who are properly qualified and cognizant of sitewide requirements because they are closely affiliated (both organizationally and geographically) with the INEL policy-setting organizations.

Instances were also identified where LMIT was working to improve processes and reduce costs through inter-organizational groups. In particular, LMIT established an integrating safety analysis review committee to risk-prioritize safety documentation updates, train personnel, and deploy resources more effectively. The organization of ES&H programs at ID closely resembles that of LMIT; ES&H professionals, including facility representatives, are matrixed to ID program managers but report to a matrix group manager who is responsible for personnel administration and resource allocation.

Most personnel within both ID and LMIT clearly understand and accept their roles and responsibilities with regard to safety management; however, the criteria by which personnel are held accountable for safety management are not always well defined in performance appraisals and/or other performance indicators. For example, managers are not held accountable for attaining waste reduction goals established in facility-specific waste minimization plans. Personnel matrixed to ICPP from the LMIT environmental support organization did not have specific position descriptions or performance indicators based on their assignments at the facility.

Regarding organizational structure, the ES&H function at ICPP is placed at a sufficiently high level in the organization to effectively influence and implement ES&H policy. The ICPP ES&H manager reports through the Director of High Level Waste to the General Manager of Nuclear Operations. There is also sufficient independence from the line organizations within the central ES&H organizations to effectively establish ES&H policy. Of particular note is the organizational structure in place at the new waste calcining facility; operations support system engineers are integrated into all

aspects of work, such as new SAR development and plant modification, maintenance, and testing.

There are many examples of effective formal and informal communication of ES&H policy and requirements throughout ICPP organizations and from the Office of the President, which establishes sitewide policy. However, there have been instances where the reorganization and communication breakdowns resulted in neglect of some sitewide policies. For example, consolidation efforts caused ICPP to discontinue waste minimization training required by the sitewide waste minimization plan to foster employee awareness and action. The central pollution prevention organization has developed training modules, but these have not been incorporated into the ICPP training program. In another case, two distinct organizations with safety responsibilities at ICPP initiated development of sitewide industrial and construction safety manuals that included overlapping and conflicting requirements.

Planning and Implementation

There have been some specific successes in requirements planning and implementation. The LMIT radiation protection program has been incorporated into ICPP operations. Facility-specific waste minimization plans have been established that translate sitewide policy into local waste minimization initiatives, and ICPP has been effective in achieving significant reductions in waste generation.

The ICPP work control system, which is organized into "core teams" of facility-specific professionals, ensures adequate priority for safety-related projects and provides for review by competent ES&H personnel to ensure that ES&H requirements are properly considered. Work packages are assigned greater priority if they are safety related. An effort at ICPP to reduce backlog work orders has resulted in a 30 percent reduction. Each work order proposed for cancellation has been reviewed by the core teams to ensure that safety is not compromised.

The ICPP Waste Management Authority is an effective and unique approach to ensuring that wastes are properly characterized, alternative management methods are considered, and RCRA inspections are conducted at ICPP waste management facilities in accordance with sitewide policy. The Waste Management Authority is composed of representatives of the major waste management facilities at ICPP and environmental professionals with experience in chemical engineering and regulatory requirements. They review individual requests for disposal and suggest alternative materials and treatment and disposal methods to ensure that technical waste acceptance criteria are met, improving regulatory compliance and waste minimization. The Waste Management Authority is also effective in reducing chemical hazards, as indicated in the Chemical Safety Vulnerability Working Group report (September 1994).

Planning and implementation of new and existing policy have proceeded at ICPP with mixed results. There has been a concerted effort to integrate ICPP-specific plans and procedures with LMIT requirements and organization; however, this effort is not nearly complete. The lack of consolidated procedures creates confusion at ICPP when work is performed by multiple former contractors (e.g., Westinghouse Idaho Nuclear Company, Inc., EG&G, and M-K Ferguson), each operating under procedures specific to their former companies.

There have been several cases of improper lockout/tagout at ICPP. These were investigated, and the cause was determined to be operator error rather than a deficiency in safety management systems. LMIT is currently on the verge of issuing a consolidated sitewide procedure for lockout/tagout, which differs from the current ICPP procedure in that it does not permit the use of "caution tags" as an interim stage of the lockout/tagout process. ICPP ES&H management plans to analyze existing caution tags to ensure that they are either eliminated or modified to conform to the new LMIT procedure.

In general, there appears to be a commitment to implement requirements on the part of DOE and LMIT senior management. One exception was noted: The ICPP implementation plan for DOE Orders 5480.22 and 5480.23 (November 1994) states that LMIT is preparing an upgraded safety analysis report for ROVER (Building CPP-640). Subsequent to the implementation plan (which was approved by ID), the new SAR for ROVER was cancelled by ID because of funding considerations and the limited time that the facility will remain active. ID and LMIT have not formally documented the basis for delaying the commitment to revise the

SAR. ID and LMIT personnel indicated that budget considerations may preclude the analyses of the full spectrum of accidents, vital system degradation, and adjoining building interdependencies in developing the authorization basis for deactivation of ROVER.

The team identified several instances where requirements were either not identified or not implemented:

- ICPP has not identified or implemented a program to inspect loading and unloading areas of treatment, storage, and disposal units daily when in use, as required by regulation.

- The radiation protection program at ICPP is generally very strong, but there are weaknesses in planning and implementation of some requirements.

- ICPP has not implemented a comprehensive program to provide initial and continuing training to waste generators on waste characterization and waste minimization programs and initiatives. There is no formal program to hold line management accountable for waste minimization goals or proper waste characterization.

- At CPP-666, a radiation monitor near the empty fuel cutting pool alarmed when fuel was moved in the transfer canal near the canal gate. Further review indicated that ICPP had not developed or implemented a requirement for lateral shielding of nuclear fuel, creating the potential for increased radiation exposure if personnel were to access the empty fuel cutting pool. This issue was subsequently determined to involve an unreviewed safety question.

Performance Measurement

ICPP is provided with a number of performance indicators to gauge its progress in implementing ES&H requirements. Quarterly reports on waste generation indicate that ICPP is having success in reducing the amount of hazardous waste requiring disposal. In the area of worker safety, ICPP has contributed to the general trend at INEL to a low lost work day incidence rate, which is among the lowest in the DOE complex. In 1994, INEL had a rate of 21.7 lost work days per 200,000 hours; the DOE 1990-94 average was 48.4. In the area of radiation protection, increases in radiological work performed at ICPP since 1992 have resulted in a steady increase in collective radiation exposure at INEL. However, ICPP's performance in reducing radiation exposure to the lowest achievable level was instrumental in INEL limiting CY-1994 collective radiation exposure to 76 percent of the annual as low as reasonably achievable (ALARA) goal.

There was evidence to suggest that both ID and LMIT were actively involved in performance measurement activities through the cost-plus-award-fee process, facility representative surveillances, informal self-assessment, and management walkthroughs. LMIT has an independent assessment organization (Quality Assurance and Oversight Branch) that provides subject matter experts to assess implementation of sitewide requirements at various facilities. ICPP has developed a number of performance indicators that are communicated throughout the facilities to apprise employees of progress in safety management, especially occupational safety and

radiation protection. ICPP is in the process of identifying specific performance indicators that can be integrated into the evolution of the site from an award fee to an incentive fee process, resulting in overall improvement in performance measurement. The ICPP ES&H manager is apprised of performance-related environmental issues through regular written reports from each of the environmental facility engineers stationed throughout ICPP.

INEL has documented weaknesses in performance evaluation systems, and corrective action implementation has been slow. Observations revealed that such weaknesses were manifested at ICPP through gaps in program evaluation scope within a given ES&H program. For example, few assessments have been conducted on the INEL radiological control program, and formal review of specific training programs (e.g., radiological control technician, waste minimization) has not occurred. Also, some important performance indicators are not formally tracked or trended to identify possible areas of risk to INEL, including waste characterization screening results and accident/illness data within LMIT Construction Management Services. ID has not developed and implemented a comprehensive self-assessment program for ICPP, and there have been few surveillances to determine implementation of environmental requirements.

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APPENDIX B

EVALUATION APPROACH AND TEAM COMPOSITION

APPENDIX B

EVALUATION APPROACH

EVALUATION METHODOLOGY

The Office of Oversight's evaluation process measures the effectiveness of Department of Energy (DOE) and contractor line management in achieving environment, safety, and health (ES&H) objectives. The goal of the approach used is to fairly and accurately assess the effectiveness of a site's overall safety management program in a way that provides value to line management.

EVALUATION PROCESS

This process focuses on safety management in the context of the guiding principles rather than on serial evaluations of individual issues or technical disciplines. The Office of Oversight strives to provide a balanced assessment of performance, emphasizing strengths as well as weaknesses. Rather than a list of non-compliances or specific deficiencies, evaluation results discuss root causes, systemic weaknesses, obstacles to improvement, and suggestions for approaching solutions. The program actively seeks and incorporates the insights and concerns of line management, workers, regulatory bodies, and other interested parties.

Evaluation of the safety management program at the Idaho National Engineering Laboratory (INEL) was based on an assessment of the effectiveness with which line management executes the guiding principles. Measurement of the effectiveness of implementation of ES&H requirements was guided by the criteria associated with the safety management principles (See above). The criteria and attributes associated with each guiding principle, as well as the lines of inquiry used, are defined in Appendix A. To facilitate the inspection, the criteria and attributes associated with each guiding principle were broken into the basic elements applicable to any management system (i.e., policy development; organization; planning and implementation; and measurement, review and evaluation).

The evaluation was conducted according to formal protocols and procedures, including: an Appraisal Process Guide providing the general procedures used by the oversight program for conducting inspections and reviews, and a Safety Management Evaluation Plan, outlining the scope and conduct of the evaluation process. Training sessions were conducted to ensure that all team members were informed of the evaluation objectives, procedures, and methods. The evaluation team collected data through interviews, document reviews, walkdowns, observation of activities, and performance testing. Over 100 interviews were conducted with Headquarters, Idaho Operations Office (ID), and Lockheed-Martin Idaho Technologies managers, technical staff, hourly workers, and union representatives.

DATA ANALYSIS

Templates for collating data on a daily basis were used as an internal team communication and analysis tool. Weaknesses, strengths, and other indicators were entered into the template on a daily basis and used for coordinating the flow of data. The template was designed for ease of analysis relative to a specific guiding principle and associated criterion. The template was also used to accumulate information for each specific safety management criterion. This analysis formed the basis for the integration of information, identification of management issues, ratings for performance under each guiding principle and its criteria, and writing the evaluation report. The analysis of data also provided the basis for redirecting the team during the inspection, as necessary. The information was evaluated and analyzed on a daily basis by team management and the management team.

Emphasis throughout the evaluation was on ensuring that data collected were valid and accurate during all phases of the evaluation. Key facts and issues were reviewed daily with site points of contact to verify their accuracy. Team management provided daily morning debriefings to site management on emerging issues.

Issue forms were generated when sufficient information was developed to identify a significant safety management issue. These forms identified the nature of the issue, observed conditions relating to the issue, the basis for the issue, and the safety significance. Issue forms were approved by the Team Leader before being provided to DOE field office management for response and followup. Based on observations and/or issues generated, the team analyzed the effectiveness of each criteria and associated attributes for each of the guiding principles. Results and conclusions were documented and ratings assigned. Color-coded windows were used to depict ratings. The team evaluated potential options for improving operations and generated candidate actions for enhancing the INEL safety management system. Finally, the report was reviewed by a management review board consisting of senior analysts and managers who ensured that the reported results reflected objectivity, comprehensive analysis, and supportable conclusions. The results of these efforts were provided in a draft report to DOE management for factual validation at the exit briefing.

TEAM COMPOSITION AND RESPONSIBILITIES

To reflect the emphasis placed on the three guiding principles of safety management, a core group of nine safety management specialists evaluated the application of these principles at INEL. Three specialists focused on each of the three guiding principles. However, given the many linkages and interfaces among the safety management elements being evaluated, the nine specialists operated as a single team.

Two additional teams were designated to evaluate safety management at the facility level. Facility Safety Management Team A evaluated the Radioactive Waste Management Complex (RWMC) and the Auxiliary Reactor Area (ARA), and Facility Safety Management Team B evaluated the Idaho Chemical Processing Plant (ICPP) and the Test Reactor Area (TRA). To facilitate coordination and communication between the groups, a safety management specialist from each of the three guiding principle areas was assigned to coordinate with Team A; similarly, another safety management specialist from each of the three guiding principle areas worked with Team B. This functional alignment ensured the overall development of appropriate and sufficient information to assess the overall effectiveness of safety management at INEL, identification of emerging management issues requiring followup at the facility level, and evaluating facility-specific safety management issues having sitewide implications.

Team composition is listed on the next page.

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Robert Crowley (Construction Safety)

Facility Safety Management
(Team B: ICPP/TRA)

Thomas Staker (Team Leader)
Alois (Skip) Singer (Radiological Protection)
Ivon E. Fergus (Criticality Safety)
John D. Psaras (Process Safety)
Lawrence McCabe (Worker Safety)
Donald Neal (Waste Management)
Mark J. DeGraff (Essential Systems)
Dolan P. Falconer (Essential Systems)
Ronald D. Shaffer (Essential Systems)

Administrative Team

Mary Anne Sirk
Tracey Blank
Dale A. Moul
Thomas C. Davis
Ann Charron
Kathy Moore

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